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U. S. DEPARTMENT OF AGRICULTURE.

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LIST OF WORKERS IN  
SUBJECTS PERTAINING TO AGRICULTURE.

PART 1. United States Department of Agriculture.

Prepared in the Division of Publications,  
JOHN L. COBBS, Jr., Chief.

PART 2. State Agricultural Colleges and Experiment Stations.

Prepared in the States Relations Service,  
A. C. TRUE, Director.

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1920-1921.



WASHINGTON  
GOVERNMENT PRINTING OFFICE

1921





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PART 1.  
UNITED STATES DEPARTMENT OF  
AGRICULTURE.

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Prepared in the Division of Publications,  
JOHN L. COBBS, Jr., *Chief*.

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# LIST OF WORKERS IN SUBJECTS PERTAINING TO AGRICULTURE.

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## UNITED STATES DEPARTMENT OF AGRICULTURE.

(Prepared in the Division of Publications, JOHN L. COBBS, Jr., *Chief*.)

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### OFFICE OF THE SECRETARY.

**Secretary of Agriculture,** HENRY C. WALLACE.

The Secretary of Agriculture is charged with the work of promoting agriculture in its broadest sense. He exercises general supervision and control over the affairs of the department and formulates and establishes the general policies to be pursued by its various branches and offices.

**Assistant Secretary of Agriculture,** E. D. BALL.

**Administrative Assistant,** HARRISON F. FITTS.

**Private Secretary to the Secretary of Agriculture,** W. A. JUMP.

**Director of Information,** HARLAN SMITH.

The Director of Information represents the Secretary in the general supervision of all information and publication activities of the Department as a whole, both in Washington and in the field.

**Chief Clerk,** ROBERT M. REESE.

The Chief Clerk has general supervision of clerks and employees; of the order of business of the department and of records of the Secretary's office; and of expenditures from appropriations for miscellaneous expenses, rents, etc. He is responsible for the enforcement of the general regulations of the department and is custodian of buildings.

**Office of the Solicitor.** R. W. WILLIAMS, *Solicitor*; C. W. BOYLE, *Assistant Solicitor*;  
*Chief Clerk,* G. L. HOFFMAN.

The Solicitor is the legal adviser of the Secretary and heads of the several branches of the Department. He directs and supervises all law work of the department.

**Food and Drugs Section.** P. D. CRONIN, *Attorney, in charge*.

In connection with the Federal food and drugs act, and the Insecticide act, this section prepares recommendations to United States attorneys for seizures, drafts informations and indictments in criminal cases, assists in the trial of important or technical cases, both civil and criminal, prepares notices of judgments, and aids in the conduct of public hearings and in drawing regulations, food-inspection decisions, and other rulings; also prepares reports of violations, briefs, and memoranda, aids in drafting regulations, and assists in the preparation for trial of cases under the seed-importation act.

**Marketing and Rural Organization and National Forests Section.** FRED LEES, *Attorney, in charge*.

This section handles law work in connection with the United States cotton-futures act, the United States grain standards act, the United States warehouse act, the standard container act, the food-products inspection law, and questions arising under the food-control act relating to licensing of stockyards and dealers thereon and the licensing of manufacturers of, and dealers in, fertilizers and farm equipment; advises the Bureau of Markets regarding the legality of various types of cooperative organizations, and concerning legal problems relative to the marketing and distribution of farm products and rural credits; conducts general correspondence and compiles laws relating to these subjects; and also does the law work arising from business of the Forest Service, including contests of claims to lands in the national forests under homestead, mineral, and other laws, cases arising out of timber, fire, fencing, and other trespasses on the national forests, opinions to the Forester and review of opinions presented to the district foresters by assistants to the Solicitor in the field, and various other legal matters connected with the national forests, such as drafting of contracts, regulations, and forms, correspondence with the Attorney General and Secretary of the Interior and miscellaneous correspondence.

*Federal Aid Road Act, Plant Quarantine, and Forest Appeals Section.* THOMAS G. SHEARMAN, *Attorney, in charge.*

This section handles legal questions and aids in drafting regulations, forms, and agreements under the Federal-aid road act, prepares reports of violations, briefs, and memoranda, aids in drafting regulations, and assists in the trial of cases under the plant quarantine law; and also investigates for the Secretary of Agriculture appeals from decisions of the Forest Service and reports findings thereon to the Secretary.

*Acquisition of Lands Section.* A. H. MCCONVILLE, *Attorney, in charge.*

In connection with the acquisition of lands under the Weeks forestry law (act of Mar. 1, 1911), this section prepares agreements of purchase, supervises and directs the work of title attorneys engaged in the examination of titles, assists United States attorneys in the conduct of condemnation proceedings, and handles correspondence with the Attorney General relating thereto.

*Compilation and Annotation of Laws Section.* O. H. GATES, *Attorney, in charge.*

This section prepares and annotates compilations of the laws applicable to the Department of Agriculture and compilations of State laws on subjects touching the work of the department.

*Meat Inspection, Animal Quarantine, and Transportation Laws, Patent, and Contract Section.* J. L. CARR, *Assistant to the Solicitor, in charge.*

This section prepares reports of violations, briefs, and memoranda, aids in drafting regulations, and assists in the trial of cases under the meat-inspection, animal quarantine, 28-hour, other animal transportation, and virus laws, and drafts complaints, informations, and indictments in the 28-hour, quarantine, and virus cases; also draws bonds, contracts, leases, and other agreements, and prosecutes applications of department employees for patents.

*Wild Life Conservation and Fiscal Section.* J. P. WENCHEL, *Assistant to the Solicitor, in charge.*

This section prepares reports of violations, briefs, and memoranda, aids in drafting regulations, and assists in the trial of cases under the Lacey Act, migratory-bird law, Alaska game law, and bird reserves law; and also prepares opinions on various questions relating to the fiscal affairs of the department and handles claims for balances due estates of deceased employees.

*Assistants to the Solicitor, Stationed in the Field.*

Branches of the Office of the Solicitor are located at Missoula, Mont., in charge of H. H. Clarke; Denver, Colo., in charge of W. J. Ise; Albuquerque, N. Mex., in charge of C. S. Brothers; Ogden, Utah, in charge of E. S. French; San Francisco, Calif., in charge of H. P. Dechant; and Portland, Oreg., in charge of W. F. Staley. These officers are legal advisers to the district foresters and handle the law work of the Forest Service in the field, besides such local legal work of the department as may be assigned them by the Solicitor.

**Office of Farm Management and Farm Economics.** H. C. TAYLOR, *Chief*; G. W. FORSTER, *Associate Agricultural Economist and Assistant Chief*; RAYMOND EVANS, *Assistant to the Chief.*

This Office conducts investigations in cost of production, farm organization, farm financial relation, farm labor, agricultural history and geography, land economics, and the problems of rural life.

*Scientific staff.*—L. G. Gray, agricultural economist; C. J. Galpin, economist; F. W. Peck and R. H. Wilcox, farm economists; C. L. Stewart, O. C. Stine, and V. N. Valgren, associate agricultural economists; H. M. Dixon and L. A. Moorhouse, associate farm economists; J. H. Arnold, George A. Billings, J. S. Cotton, Byron Hunter, J. M. Johnson, and A. D. McNair, agriculturists; Frederick D. Stevens, assistant agriculturist; C. O. Brannen, Clyde R. Chambers, Albert B. Genung, N. A. Olsen, J. T. Sanders, R. R. Spafford, and E. O. Wooton, assistant agricultural economists; Walter H. Baumgartel and Emily F. Hoag, assistant economists; M. R. Cooper, W. C. Funk, C. L. Goodrich, H. W. Hawthorne, H. A. Miller, Frank Montgomery, Earl D. Strait, Carl L. Swinson, and Raymond S. Washburn, assistant farm economists; E. A. Boeger, L. G. Connor, Bertha Henderson, Ida M. Spasoff, Jesse W. Tapp, and Howard A. Turner, junior agricultural economists; Albert P. Brodell, Elmer E. Englebert, and Veda B. Larson, junior economists; R. D. Jennings, Oscar Juve, G. S. Klemmedson, Bruce McKinley, L. A. Reynoldson, and F. H. Shelledey, junior farm economists; Wayne C. Nason, assistant in rural organization; Lila Thompson, research assistant in agricultural geography.

**Office of Inspection.** ALEX. MCC. ASHLEY, *in charge*.

Investigates or reviews all personnel cases involving disciplinary action by the Secretary; is charged with the accounting and administrative examination of claims and the preparation of financial reports involving appropriations under the Office of the Secretary; and assists in the fiscal operation of the bureaus.

**Chief Personnel Officer,** P. L. GLADMON.

The Chief Personnel Officer prepares all papers connected with appointments, transfers, promotions, reductions, details, furloughs, and removals, and has charge of correspondence with the Civil Service Commission. He is the custodian of oaths of office and personal records. He has the custody and use of the department seal.

#### WEATHER BUREAU.

*Chief,* CHARLES F. MARVIN; *Assistant Chief,* C. C. CLARK; *Chief Clerk,* R. H. WEIGHTMAN.

The Weather Bureau has charge of the forecasting of the weather; the issue and display of weather forecasts and storm, cold-wave, frost, and flood warnings; the gauging and reporting of river stages; the maintenance and operation of the United States Weather Bureau telegraph and telephone lines; the collection and transmission of marine intelligence for the benefit of commerce and navigation; the reporting of temperature and rainfall conditions for agricultural interests; and the taking of such meteorological and seismological observations as may be necessary to determine and record the climatic and seismic conditions of the United States.

**Forecast Division,** EDGAR B. CALVERT, *in charge*.

This division supervises the receiving and charting, twice daily, of telegraphic reports of the prevailing weather conditions and distribution of information as to current weather conditions and forecasts of impending weather changes in all parts of the country; also warnings of storms, hurricanes, cold waves, frosts, heavy snows, etc., for the special benefit of agriculture, commerce, and navigation, including aviation.

**River and Flood Division,** H. C. FRANKENFIELD, *in charge*.

This division has charge of the collection of information as to stages of water along the navigable rivers, the issue of flood warnings, and the study of the regimen of the rivers of the United States. It gathers information on the depth of snowfall in the mountains of the West, for a study of the flow of water in the streams supplying irrigation projects, and on the rate of evaporation from ponds and lakes, in the interest of water storage for irrigation, power development, and navigation. It supervises, on the part of the Weather Bureau, the experiment stations maintained jointly by the Weather Bureau and the Forest Service.

**Division of Agricultural Meteorology,** J. WARREN SMITH, *in charge*.

This division conducts studies regarding the relation of weather to crops, and collects statistical data required in such studies, having the direction and supervision of co-operative relations with the State experiment stations and other contributing organizations. It supervises the work of about 400 special stations, maintained in connection with the corn, wheat, cotton, sugar, rice, tobacco, fruit, and cattle industries. The division supervises the distribution of special warnings for the benefit of growers of certain crops. Data showing the current weather conditions throughout the country and the effects of those conditions upon important crops are collected and published throughout the year; and the issue of weather crop summaries at the various State centers is supervised.

**Climatological Division,** PRESTON C. DAY, *in charge*.

This division has charge of the collection, study, and publication of climatological data for the United States. It has general supervision of the work of about 4,500 cooperative stations and about 35 special meteorological stations. From these stations are collected the records of daily observations of temperature, precipitation, and other meteorological conditions necessary to establish the history of the climate of the various portions of the United States. It also supervises the equipment and personnel of stations maintained in connection with the principal agricultural activities of the country. The division has supervision of a bulletin issued weekly during the winter months, showing depth of snow on ground, and thickness of ice in rivers and harbors, and from time to time issues special bulletins or papers bearing on climatological subjects. It has charge of the preparation of the climatological portions of the annual reports of the bureau, and supervises the monthly and annual summaries and other publications of the climatological services of the various States. This division has charge of the barometry of the United States, and of the preparation of the normals of pressure, temperature, precipitations, etc.



**Marine Division, FRANKLIN G. TINGLEY, in charge.**

This division supervises the work of securing and collating reports from marine observers containing information pertaining to the oceans.

**Instrument Division, BENJAMIN C. KADEL, in charge.**

Has supervision of the maintenance of a high standard of instrumentation and equipment for the meteorological and seismological observational work of the Bureau generally, involving the supervision of the installation and methods of use of the instruments and equipment required for meteorological observations of the Bureau in the field; the installation and maintenance of the display equipment of storm-warning stations; supervision of all evaporation work; installation and maintenance of automatic river gages; the adjustment and application of corrections of instruments in the hands of observers in the field; problems relating to protection from lightning; the testing, standardizing, and repairing of all apparatus; and the designing and constructing of new instrumental equipment required for the work of the Weather Bureau.

**Telegraph Division, S. PERCY MINNICK, in charge.**

This division receives, transmits, and records all telegrams from the central office, supervises the telegraph work performed at field stations, arranges telegraph circuits, maintains and repairs United States Weather Bureau telegraph lines and submarine cables, and examines all telegraph and field telephone accounts.

**Library, CHARLES F. TALMAN, in charge.**

The library includes standard works of reference, technical books on meteorology and allied sciences, and a complete file of the publications of meteorological and climatological services in all parts of the world. A catalogue is prepared of the meteorological contents of all the principal scientific periodicals of the world, including proceedings and transactions of societies. Translations from foreign languages are made in the library.

**Office of the Editor, CHARLES F. BROOKS, in charge.**

This office edits and supervises the publication of the Monthly Weather Review; it also has general editorial supervision over scientific and semiscientific papers submitted for publication by the Bureau, calling attention to such of these as seem appropriate for the Monthly Weather Review or the Journal of Agricultural Research, the daily press, etc. It prepares such summaries and indexes as may be necessary, and also abstracts and notes covering the progress of meteorology.

**Printing Division, CHARLES T. BURNS, in charge.**

The division prints and mails the daily weather map and the various charts and miscellaneous printed matter pertaining to the Bureau, and has the custody of and distributes station forms.

**Division of Supplies, BENJAMIN A. BLUNDON, in charge.**

This division purchases and issues supplies and is charged with the safe-keeping of all property belonging to the Bureau.

**Stations and Accounts Division, DELOS T. MARING, in charge.**

This division audits, adjusts, and prepares for payment all accounts and claims against the Bureau; prepares advertisements; issues requests for passenger transportation; transacts all business relating to the financial interests of the Bureau; and supervises the construction of Weather Bureau buildings outside of Washington, including repairs thereto.

**Solar Radiation Investigations, HERBERT H. KIMBALL, in charge.**

Principally concerned with measurements of the rate at which heat is received at the surface of the earth by radiation during the day from the sun and sky combined and from each source separately; also that lost at night, and the relation of these measurements to atmospheric conditions.

**Seismological Investigations, WILLIAM J. HUMPHREYS, in charge.**

These investigations include the collection and study of both instrumental records and personal observations of earthquake phenomena throughout the United States. One of the immediate objects in view is the detailed mapping of the country with reference to existing faults on the lines of weakness of the earth's crust as evidenced by breaks or movements thereon that occasionally take place, causing small local earthquakes. Such maps are of interest to those who have occasion to locate dams and similar important permanent structures.

**Aerological Investigations.** WILLIS R. GREGG, *in charge*.

The work includes the making of observations at certain field stations by means of kites and balloons and the reduction, study, and publication of the data thus obtained with a view to extending our knowledge of the dynamics of the atmosphere and the making available to artillery, aviation, and other interests useful and practical information. Data of the upper air thus obtained are telegraphed to Washington for use in diagnosing general weather conditions and for furnishing information on conditions in the free air for the use of aviators. At the present time there are in operation six stations at which upper-air observations are made by means of kites and balloons and eight others where balloons only are used.

**Weather Bureau stations and work outside of Washington, D. C.**

This bureau maintains throughout the United States, in the West Indies, in Alaska, and in Hawaii about 200 meteorological stations employing from 1 to 15 men each.

For forecast purposes the United States is divided into districts comprising: (1) The upper Mississippi Valley and the northwest, Henry J. Cox, Chicago, Ill., in charge. (2) Louisiana, Texas, Arkansas, and Oklahoma, Isaac M. Cline, New Orleans, La., in charge. (3) Utah, Colorado, New Mexico, and Arizona, Julius M. Sherier, Denver, Colo., in charge. (4) California, Nevada, Washington, Oregon, and Idaho, Edward A. Beals, San Francisco, Calif., in charge. (5) The remainder of the United States, forecaster on duty (Edward H. Bowie or Charles L. Mitchell), Washington, D. C., in charge.

For the collection and distribution of climatological data the United States, including Alaska, Porto Rico, and Hawaii, is divided into 45 sections, generally coextensive with States, which, with the names of the officials in charge and the section centers, are as follows:

Alabama: Patrick H. Smyth, Montgomery.  
 Alaska: Melvin B. Summers, Juneau.  
 Arizona: Robert Q. Grant, Phoenix.  
 Arkansas: Harvey S. Cole, Little Rock.  
 California: Edward A. Beals, San Francisco.  
 Colorado: Julius M. Sherier, Denver.  
 Florida: Alexander J. Mitchell, Jacksonville.  
 Georgia: Charles F. von Herrmann, Atlanta.  
 Hawaii: Lawrence H. Daingerfield, Honolulu.  
 Idaho: Clinton E. Norquest, Boise.  
 Illinois: Clarence J. Root, Springfield.  
 Indiana: John H. Armington, Indianapolis.  
 Iowa: Charles D. Reed, Des Moines.  
 Kansas: Snowden D. Flora, Topeka.  
 Kentucky: James L. Kendall, Louisville.  
 Louisiana: Isaac M. Cline, New Orleans.  
 Maryland and Delaware: James H. Spencer, Baltimore, Md.  
 Michigan: Charles F. Schneider, Grand Rapids.  
 Minnesota: Ulysses G. Pursell, Minneapolis.  
 Mississippi: Robert T. Lindley, Vicksburg.  
 Missouri: George Reeder, Columbia.  
 Montana: William T. Lathrop, Helena.  
 Nebraska: George A. Loveland, Lincoln.

Nevada: Henry F. Alps, Reno.  
 New England: John W. Smith, Boston, Mass.  
 New Jersey: G. Harold Noyes, Trenton.  
 New Mexico: Charles E. Linney, Santa Fe.  
 New York: Wilford M. Wilson, Ithaca.  
 North Carolina: Lee A. Denson, Raleigh.  
 North Dakota: Orris W. Roberts, Bismarck.  
 Ohio: William H. Alexander, Columbus.  
 Oklahoma: J. Pemberton Slaughter, Oklahoma City.  
 Oregon: Edward L. Wells, Portland.  
 Pennsylvania: George S. Bliss, Philadelphia.  
 Porto Rico: Oliver L. Fassig, San Juan.  
 South Carolina: Richard H. Sullivan, Columbia.  
 South Dakota: Montello E. Blystone, Huron.  
 Tennessee: Roscoe Nunn, Nashville.  
 Texas: Bernard Bunnemeyer, Houston.  
 Utah: J. Cecil Alter, Salt Lake City.  
 Virginia: Edward A. Evans, Richmond.  
 Washington: George N. Salisbury, Seattle.  
 West Virginia: Henry C. Howe, Parkersburg.  
 Wisconsin: William P. Stewart, Milwaukee.  
 Wyoming: George W. Pitman, Cheyenne.

**BUREAU OF ANIMAL INDUSTRY.**

*Chief*, JOHN R. MOHLER; *Assistant Chief*, B. H. RAWL; *Assistant to the Chief*, CHARLES C. CARROLL; *Chief Clerk*, J. R. COHRAN.

The Bureau of Animal Industry has charge of the work of the department relating to the live-stock industry. In general it deals with the investigation, control, and eradication of diseases of animals, the inspection and quarantine of live stock, the inspection of meat and meat food products, and with animal husbandry and dairying.

**Animal Husbandry Division, GEORGE M. ROMMEL, Chief.**

This division studies the breeding and feeding of farm animals and poultry, and passes upon the pure breeding of animals imported into the United States for breeding purposes. The division is engaged in work in cooperation with the War Department in encouraging the breeding of horses for military purposes. It studies also poultry and egg production and methods of improving the quality of farm eggs, and is engaged in the organization of boys' and girls' pig and poultry clubs in cooperation with the States Relations Service of the department and State agricultural colleges.

*Animal genetics.*—Sewall Wright, in charge; O. S. Eaton.

*Beef cattle investigations.*—E. W. Sheets, in charge; V. V. Parr, W. H. Black, A. T. Semple.

*Horse and mule investigations.*—George A. Bell, John O. Williams, R. S. Whitfield, G. C. Dignan.

*Poultry investigations.*—Harry M. Lamon, in charge; Rob. R. Slocum, A. R. Lee, D. M. Green, J. T. Quinn.

*Sheep and goat investigations.*—D. A. Spencer, in charge; L. O. Benedict, C. G. Potts.

*Swine investigations.*—E. Z. Russell, in charge; John Zeller, George A. Anthony, O. G. Hankins, S. S. Buckley.

*U. S. experimental farm, Beltsville, Md.*—Benjamin F. Brandon, in charge.

*U. S. Morgan horse farm, Middlebury, Vt.*—H. H. Reese, in charge.

*U. S. sheep experiment station, Dubois, Idaho.*—V. O. McWhorter, in charge.

**Biochemic Division, M. DORSET, Chief.**

This division prepares tuberculin and mallein for free distribution to health officers for use in official tests; conducts experiments with the object of obtaining vaccines and antitoxins for animal diseases; carries on researches concerning the causes of certain infectious diseases; takes part in the control of viruses, serums, toxins, and analogous products intended for use in the treatment of domestic animals; carries on experiments with dips and disinfectants; and assists in enforcing the insecticide act of 1910 by examining articles intended for use in combating insects and fungi which infest domestic animals. It carries on bacteriological and chemical research work relative to meat and meat food products in connection with the meat inspection.

*Scientists in charge of sections.*—J. A. Emery, assistant chief and member of the Insecticide and Fungicide Board; C. N. McBryde, in charge of bacteriological investigations of meats; R. M. Chapin, in charge of dips and disinfectants; Ralph Hoagland, in charge of biochemical investigations of meats; W. B. Niles, in charge of hog-cholera serum production.

**Dairy Division, B. H. RAWL, Chief; C. W. LARSON, Dairy Expert.**

This division collects and disseminates information concerning dairy farming, the care and improvement of dairy cattle, and the production, care, and distribution of dairy products. It is charged also with the details of administration of the laws concerning the inspection of factories and markets for "renovated" or "process" butter. It carries on research concerning the chemistry and bacteriology of dairy products and in engineering problems that affect various branches of the dairy industry. It also co-operates with State and local institutions in educational work in dairying.

*Miscellaneous.*—D. Stuart, dairy husbandry; H. T. Baldwin, editor; R. R. Graves, dairy cattle breeding; K. E. Parks and J. T. Bowen, dairy engineers; T. R. Pirtle, dairy statistician.

*Research laboratories.*—L. A. Rogers, in charge; W. R. Albus, S. H. Ayers, C. A. Cary, E. F. Deysher, F. R. Evans, C. M. Gere, S. A. Hall, A. M. Hartman, Alan Leighton, K. J. Matheson, J. B. McNair, C. L. McArthur, E. B. Meigs, C. S. Mudge, E. H. Parfitt, P. Rupp, R. H. Shaw, J. M. Sherman, A. C. Weimar, O. E. Williams, P. A. Wright, H. F. Zoller.

*Dairy farming investigations and demonstrations.*—Helmer Rabild, in charge; E. V. Ellington. This work includes: (1) Southern dairying: ———, in charge. (2) Utilization of milk and its products: Jessie M. Hoover, Louise G. Holbrook. (3) Cow-testing associations, and dairy work with county agents: E. F. Burton, A. J. Cramer, J. C. McDowell, H. C. Searles, Erwin Sutton, L. V. Wilson. (4) Bull associations: J. G. Winkler, H. E. Smith, J. A. Conover.

*Dairy manufacturing investigations and renovated-butter inspection.*—S. C. Thompson, in charge; William White, assistant; W. L. Clevenger, F. R. Farnham, L. H. Marlatt, H. S. Merry, C. E. Newlander, D. R. Noland, M. P. A. Sondergaard, G. N. Tobey.

*Market-milk investigations.*—Ernest Kelly, in charge; J. B. Bain, C. J. Babcock, G. E. Braun, L. H. Burgwald, C. E. Clement, J. A. Gamble, R. P. Hotis, R. S. Smith.

*Western dairy investigations.*—J. E. Dorman, in charge; C. V. Castle, Chris Johnsen, H. R. Lochry, R. J. Posson.



*Beltsville farm.*—T. E. Woodward, superintendent; H. T. Converse, assistant.

*Experiments and demonstrations in live-stock production.*—Iberia Live-Stock Farm, Jeanerette, La.; J. R. Quesenberry, superintendent; Arthur Fischer, R. R. Graves.

*Experiments in dairying and live-stock production in western United States.*—B. H. Rawl, R. R. Graves, J. B. Shepherd.

**Field Inspection Division,** A. W. MILLER, *Chief*; W. P. ELLENBERGER, *Assistant*.

This division, in cooperation with State authorities, is charged with the work of eradicating scabies in cattle and sheep and dourine in horses. It has supervision over the interstate transportation of live stock, including inspection, disinfection, certification, etc.; also the details of administering the 28-hour law governing the humane handling of live stock in transit; and the mallein testing of horses for interstate movement.

*Inspectors in charge of scabies and dourine eradication in the field.*—A. J. Payne, Sacramento, Calif.; J. C. Exline, Walla Walla, Wash.; F. E. Murray, Salt Lake City, Utah; F. L. Schneider, Albuquerque, N. Mex.; C. H. Hays, Lincoln, Nebr.; W. E. Howe, Denver, Colo.; H. H. Cohenour, Bismarck, N. Dak.; H. Grafke, Fort Worth, Tex.; H. M. Graefe, Topeka, Kans.; J. O. Wilson, Pierre, S. Dak.; Rudolph Snyder, Helena, Mont.

**Division of Hog-Cholera Control,** U. G. HOUCK, *Chief*; T. P. WHITE, *Assistant*.

The work has for its object the suppression and control of hog cholera. It is conducted in cooperation with the educational forces of agricultural colleges and State regulatory authorities legally charged with the investigation, control, and eradication of contagious and infectious diseases of live stock.

*Inspectors in charge of hog-cholera control in the field.*—A. L. Hirlleman, Atlanta, Ga.; Edward Horstman, Baton Rouge, La.; J. B. Hollenbeck, Bismarck, N. Dak.; W. K. Lewis, Columbia, S. C.; I. K. Atherton, College Park, Md.; L. E. Davis, Columbus, Ohio; W. E. Howe, Denver, Colo.; F. H. Thompson, Des Moines, Iowa; M. Zurkow, Dover, Del.; H. Grafke, Fort Worth, Tex.; W. F. Biles, Frankfort, Ky.; Rudolph Snyder, Helena, Mont.; E. B. Haskin, Indianapolis, Ind.; H. L. Fry, Jackson, Miss.; Ralph Graham, Jefferson City, Mo.; H. M. Newton, Lansing, Mich.; C. H. Hays, Lincoln, Nebr.; Joe H. Bux, Little Rock, Ark.; J. T. Purcell, Madison, Wis.; H. C. Wilson, Troy, Ala.; Robert Jay, Nashville, Tenn.; T. M. Owen, Norfolk, Va.; C. F. Harrington, Oklahoma, Okla.; F. D. Owen, Raleigh, N. C.; A. J. Payne, Sacramento, Calif.; F. E. Murray, Salt Lake City, Utah; James McDonald, Springfield, Ill.; L. E. Lyons, Tallahassee, Fla.; H. M. Graefe, Topeka, Kans.; W. A. Sullivan, Boise, Idaho.

**Meat Inspection Division,** R. P. STEDDOM, *Chief*.

The work of the Meat Inspection Division includes the ante-mortem and post-mortem inspection of cattle, sheep, swine, and goats slaughtered at establishments engaged in interstate or foreign commerce; the supervision of such establishments and of the various processes of preparing, curing, canning, packing, etc., so as to insure sanitary conditions, equipment, and methods; the laboratory examination of meat and products and all ingredients used in the preparation thereof; the condemnation and proper disposal of carcasses and products found to be diseased, unwholesome, or otherwise unfit for human food; the marking and certification of meats and products that have been inspected and passed; and the regulation and supervision of the interstate transportation, exportation, and importation of meats and meat food products.

*Assistants.*—George Ditewig, in charge of western division; A. J. Pistor, in charge of eastern division; W. H. Smith, in charge of exports, imports, transportation, and exemptions; R. H. Kerr, in charge of laboratories; G. H. Parks, expert in sanitation; F. W. Meyst, in charge of labeling; A. E. Harris, in charge of records.

A directory showing the 240 meat-inspection stations and inspectors in charge may be obtained on application to the bureau.

**Miscellaneous Division,** A. M. FARRINGTON, *Chief*; GEORGE H. RUSSELL, *Assistant (Personnel)*.

This division keeps the records of the projects of work in which the bureau is engaged; has charge of the work relating to the personnel, such as appointments, transfers, assignments to duty, efficiency records, etc.; endeavors to promote veterinary education and to assist veterinary colleges in providing adequate courses of instruction to qualify men for the veterinary service of the bureau; and attends to miscellaneous duties.

**Pathological Division,** JOHN S. BUCKLEY, *Chief*.

This division conducts scientific investigations of animal diseases; carries on experiments with immunizing agents for the purpose of protecting animals against disease; cooperates with the State agricultural experiment stations with a view to combating

diseases peculiar to the localities; determines pathological specimens referred to the division for diagnosis; prepares and distributes blackleg vaccine; and investigates effects of poisonous plants on live stock.

*Scientific staff.*—H. J. Washburn, senior bacteriologist; Robert J. Formad, pathologist; B. A. Gallagher, bacteriologist in charge of investigations concerning diseases of poultry; L. T. Giltner, in charge of investigations of miscellaneous diseases of animals; J. M. Buck, bacteriologist in charge of investigations in contagious abortion; G. T. Creech, assisting in contagious abortion investigations; H. W. Schoening, in charge of investigations in dourine and glanders; W. S. Gochenour, Hubert Bunyea, veterinary inspectors; C. B. Breininger, in charge of blackleg investigations; W. N. Berg, physiologist; C. D. Marsh, physiologist in charge of investigations of stock poisoning by plants; A. B. Clawson, physiologist in poisonous-plant investigations; J. F. Couch, pharmacological chemist; G. C. Roe, assistant in poisonous-plant investigations; L. Enos Day, in charge of branch pathological laboratory at Chicago, Ill.; George Byron Morse, in charge of branch pathological laboratory at South Omaha, Nebr.; George W. Stiles, in charge of branch pathological laboratory, Denver, Colo.

**Quarantine Division,** RICHARD W. HICKMAN, *Chief*; GEORGE W. POPE, *Assistant Chief*.

The inspection and quarantine of imported animals with a view to excluding contagion, the management of the animal quarantine stations, and the inspection of live stock for export come under this division. The ships carrying exported animals are also inspected, and regulations as to fittings, equipment, ventilation, feed, water, attendants, etc., are enforced. The Quarantine Division administers the sanitary regulations governing the importation of hides and skins, glue stock, hair, wool, and other animal by-products, hay, straw, forage, etc., and directs the tuberculin testing of cattle and the mallein testing of horses for export and import.

**Tick Eradication Division,** R. A. RAMSAY, *Chief*; R. E. JACKSON, *Assistant*.

This division, in cooperation with State live-stock sanitary organizations in the Southern States, is charged with the work of eradicating ticks which infest cattle and transmit disease. It also has supervision of the interstate movement of cattle from the area under quarantine for cattle ticks.

*Inspectors in charge of tick eradication in the field.*—L. J. Allen, Oklahoma, Okla.; Harry Grafke, Fort Worth, Tex.; G. W. Rosenberger, Little Rock, Ark.; Edward Horstman, Baton Rouge, La.; C. J. Becker, Birmingham, Ala.; J. A. Barger, Jackson, Miss.; W. M. MacKellar, Atlanta, Ga.; E. M. Nighbert, Jacksonville, Fla.; W. K. Lewis, Columbia, S. C.; Hartwell Robbins, Washington, N. C.

**Tuberculosis Eradication Division,** J. A. KIERNAN, *Chief*; A. E. WIGHT, *Assistant*.

This division, in cooperation with State authorities, is charged with the work of eradicating tuberculosis of farm animals. It has supervision over the tuberculin testing of cattle for interstate movement.

*Inspectors in charge of tuberculosis eradication in the field.*—H. B. Leonard, Albany, N. Y.; F. L. Schneider, Albuquerque, N. Mex.; W. M. MacKellar, Atlanta, Ga.; J. B. Reidy, Augusta, Me.; T. A. Ladson, Baltimore, Md.; C. J. Becker, Birmingham, Ala.; H. H. Cohenour, Bismarck, N. Dak.; W. A. Sullivan, Boise, Idaho; E. A. Crossman, Boston, Mass.; George W. Neff, Charleston, W. Va.; John T. Dallas, Cheyenne, Wyo.; J. J. Lintner, Chicago, Ill.; W. K. Lewis, Columbia, S. C.; Leo E. Davis, Columbus, Ohio; W. E. Howe, Denver, Colo.; F. H. Thompson, Des Moines, Iowa; H. Grafke, Fort Worth, Tex.; W. F. Biles, Frankfort, Ky.; P. E. Quinn, Harrisburg, Pa.; Rudolph Snyder, Helena, Mont.; E. I. Smith, Hartford, Conn.; E. B. Haskin, Indianapolis, Ind.; J. A. Barger, Jackson, Miss.; Ralph Graham, Jefferson City, Mo.; T. E. Rich, Lansing, Mich.; Clark H. Hays, Lincoln, Nebr.; Joe H. Bux, Little Rock, Ark.; J. S. Healy, Madison, Wis.; A. J. De Fosset, Montpelier, Vt.; W. B. Lincoln, Nashville, Tenn.; R. W. Tuck, New Orleans, La.; W. C. Drake, jr., Oklahoma City, Okla.; S. O. Fladness, Olympia, Wash.; J. O. Wilson, Pierre, S. Dak.; Sam B. Foster, Portland, Oreg.; R. E. Brookbank, Richmond, Va.; A. J. Payne, Sacramento, Calif.; W. J. Fretz, St. Paul, Minn.; F. E. Murray, Salt Lake City, Utah; J. G. Fish, Tallahassee, Fla.; H. M. Graefe, Topeka, Kans.; W. G. Middleton, Trenton, N. J.

**Division of Virus-Serum Control,** D. I. SKIDMORE, *Chief*; R. E. HOLM, *Assistant*.

This division is charged with the enforcement of the virus-serum-toxin act of 1913, which regulates the preparation, sale, barter, exchange, shipment, and importation of all viruses, serums, toxins, and analogous products intended for use in the treatment of domestic animals. United States veterinary licenses are issued for the preparation of veterinary biological products at domestic establishments, and United States veterinary permits are issued to importers of such products. Inspections are made of the establish-

ments of all firms making application for license. This inspection covers the construction and equipment of the plant, the methods employed in the preparation of products, and the manner of keeping records. General supervision over the preparation and testing of all products is maintained in order to insure, so far as possible, that the products are not worthless, contaminated, dangerous, or harmful within the meaning of the act.

**Zoological Division, B. H. RANSOM, Chief.**

This division investigates diseases of parasitic origin, collects and describes animal parasites of all kinds, determines such parasites as are sent to the bureau for identification, and keeps a card index of animal parasites and a bibliography of literature relating to them.

*Scientific staff.*—Maurice C. Hall, senior zoologist; Albert Hassall, Benjamin Schwartz, assistant zoologists; Edward A. Chapin, Eloise B. Cram, junior zoologists; Marion Imes, in charge of investigations on the treatment and control of external parasites, Kansas City, Kans.; Cooper Curtice, in charge of experiments in the eradication and control of internal parasites of sheep, Vienna, Va.; H. B. Raffensperger, zoological investigations relating to meat inspection and investigations on internal parasites of hogs, Chicago, Ill.

**Experiment Station, E. C. SCHROEDER, Superintendent.**

The experiment station of the bureau is located at Bethesda, Md. It conducts investigations of animal diseases with a view to their control and eradication and their bearing on the public health. A small farm is maintained in such a manner as to provide the other divisions of the bureau with facilities for making observations for which large domestic animals are needed. The work of the station consists of both independent original investigations and investigations in cooperation with and supplemental to those of the other divisions.

W. E. Cotton, assistant superintendent; A. B. Crawford, scientific assistant.

**Editorial Office, D. S. BURCH, Editor.**

This office edits manuscripts prepared in the bureau, compiles and prepares information and material for publication and other uses, writes articles and reports, attends to correspondence relating to publications and miscellaneous subjects, makes translations, reads proof, and aids in the "better sires" campaign and keeps the records thereof.

**FOREST SERVICE.**

*Forester, WILLIAM B. GREELEY; Associate Forester, EDWARD A. SHERMAN.*

The Forest Service administers the national forests, studies forest conditions, forest management, and methods of forest utilization, investigates the mechanical and physical properties of woods and the processes employed in the manufacture of forest products, and gathers information concerning the needs of the various wood-using industries and the relation of forests to the public welfare generally.

The work of the Forest Service is organized under the office of the Forester, 7 branches, 8 districts, and 152 national forests.

**Office of the Forester.**

**Finance and Accounts, M. E. FAGAN, Chief.**

This office is in charge of all fiscal affairs pertaining to the Forest Service—general bookkeeping, controlling accounts, allotments, and liabilities, and all operations of fiscal agents.

**Branch of Operation.**

ROY HEADLEY, *Assistant Forester in charge*; PAUL D. KELLETER, *General Assistant*; G. G. ANDERSON, *Assistant in Personnel*; EVAN W. KELLEY, *In Charge of Fire Protection*; G. M. RANDAL, *In Charge of Maintenance*; S. L. McLAURIN, *Property Clerk*.

This branch has general supervision of finances, personnel, quarters, equipment and supplies, and of fire protection and permanent improvement work on the national forests.

**Supply Depot, Ogden, Utah, J. G. FALCK, Purchasing Agent.**

**Branch of Forest Management.**

E. E. CARTER, *Assistant Forester in charge*; R. C. STABNER, *Forest Inspector*; HARRY IRION, *Office Assistant*.

**Western Division, J. F. PRESTON, Forest Inspector in charge; C. G. SMITH, Forest Inspector.**

**Eastern Division, J. G. PETERS, Forest Inspector, acting in charge; L. S. MURPHY, C. R. TILLOTSON, and J. A. MITCHELL, Forest Examiners.**



**Cooperation with Private Timberland Owners, AUSTIN CARY, *Logging Engineer.***

Through the district foresters the Branch of Forest Management has supervision of timber sales, timber trespass, and reforestation on the national forests, and of working plans for the administration of their timber resources. It cooperates with other departments of the Federal Government, with States, and with private owners in the practice of forestry on lands outside national forests, including the supervision of expenditures for fire protection under the act of March 1, 1911, on the watersheds of navigable streams. Its divisions deal respectively with the forests west and east of the Great Plains.

**Branch of Grazing.**

WILL C. BARNES, *Assistant Forester in charge*; J. W. NELSON, *Inspector of Grazing.*

The Branch of Grazing has, through the district foresters, general supervision of the range in the national forests. When the number of stock to be allowed on each national forest has been determined by the Secretary of Agriculture, the Branch of Grazing establishes the year-long grazing fee to be charged for each class of stock. It also conducts investigations concerning the best use of the forage resources of the national forests.

**Grazing Studies, WILLIAM R. CHAPLINE, *Inspector of Grazing*; CLARENCE L. FORSLING, *Grazing Examiner.***

This office deals with investigations aimed to bring about more efficient utilization by live stock of the annual forage crop produced on ranges within the national forests. It is also directing the survey and type classification of range lands within the national forests.

**Forest Investigations, WILLIAM A. DAYTON, *Plant Ecologist.***

**Range Reserve Experiments, Jornada Reserve: ENOCH W. NELSON, *Grazing Examiner in charge, Las Cruces, N. Mex.*; JACK E. MARLOWE, *Grazing Assistant.* Santa Rita Reserve: R. R. HILL, *Grazing Examiner in charge, Tucson, Ariz.***

**Great Basin Experiment Station, Manti National Forest: ARTHUR W. SAMPSON, *Plant Ecologist in charge.***

**Branch of Lands.**

L. F. KNEIPP, *Assistant Forester in charge.*

This branch has general supervision of all matters relating to the application of the public-land laws to the lands within the national forests, the acquisition of lands under the Weeks law, and the uses of national forest lands other than timber sales, grazing, and water power.

**Land Adjustment, W. J. MANGAN, *Executive Assistant.***

Examination and classification of lands within the national forests to determine their value for forest purposes. Review of appeals in land cases. Action on occupancy trespass. Preparation of reports and agreements in land exchanges. Records and reports in land litigation.

**Occupancy, CHARLES H. SQUIRE, *Inspector of Lands.***

This office has general supervision of all work pertaining to the examination of, and reporting on, lands within the national forests title to which is sought under the public-land laws. Where the acquisition of title is opposed the office cooperates with the office of the Solicitor in procuring necessary evidence. The office also has general charge of all matters relating to the occupancy of national forest land for any purpose except grazing and water power. This includes the granting of rights of way for railroads, irrigation projects, etc.

**Acquisition of Lands under the Weeks Law, W. W. ASHE, *Forest Inspector.***

This office designates the areas where lands are to be purchased, receives proposals, appraises lands, conducts tentative negotiations, prepares recommendations to the Secretary of Agriculture and the National Forest Reservation Commission, and makes surveys of lands to be acquired under the act of March 1, 1911, for the protection of the watersheds on navigable streams.

**Branch of Research.**

EARLE H. CLAPP, *Assistant Forester in charge*; S. T. DANA, *Forest Economist and Assistant Chief*; RAPHAEL ZON, *Forest Economist*; HARRY IRION, *Office Assistant*.

This branch has general supervision, either directly or through the district foresters, over investigations in dendrology, forest management, forest protection, forest utilization, and forest products. It also collects statistics relating to our forest resources and their utilization, and studies general economic questions bearing on forestry, and forest administration.

**Dendrology**, GEORGE B. SUDWORTH, *Dendrologist*.

This office is charged with investigations relating to the life history of native and exotic forest trees, their distribution, distinguishing characteristics, habits, and associations in the formation of forests, etc.; also the selection, adaptation, and care of trees for shade and ornamental purposes.

**Forest Investigations**, J. KITTRIDGE, JR.

The Office of Forest Investigations deals mainly with the scientific problems underlying the management of forests. It directs the work at the silvicultural forest experiment stations, and investigates the factors controlling the distribution of forests and forest trees, their protection from fire, the relation of forest to stream flow and climate, the conditions under which natural regeneration of cut-over, burned-over, or otherwise denuded areas takes place, and the species and methods adapted to use in artificial reforestation under varying site conditions. It also conducts investigations of farm woodlands and the best methods of handling them. The library of the Forest Service, containing over 21,000 books and pamphlets on forestry and allied subjects, is connected with the office.

*Studies*.—E. H. Frothingham, W. N. Sparhawk, W. D. Sterrett, E. R. Hodson, W. R. Mattoon, Georgia E. Wharton.

*Forest Measurements*.—W. B. Barrows.

*Library*.—Helen E. Stockbridge.

*Compilation*.—Elizabeth B. Leech.

**Experiment Stations.**

*Cloquet, in cooperation with the University of Minnesota*.—W. H. Kenety, Cloquet, Minn.

*Priest River, Kaniksu National Forest*.—Julius A. Larsen, Priest River, Idaho.

*Fremont, Pike National Forest*.—C. G. Bates, Colorado Springs, Colo.

*Wagon Wheel Gap, Rio Grande National Forest, in cooperation with the Weather Bureau*.—Edwin H. Jones, Wagon Wheel Gap, Colo.

*Fort Valley, Coconino National Forest*.—G. A. Pearson, Flagstaff, Ariz.; S. S. Van Boskirk, F. Haasis, C. F. Korstian, Ogden, Utah; E. N. Munns, San Francisco, Calif.

*Wind River, Columbia National Forest*.—Julius V. Hoffman, Stabler, Wash.

**Forest Products Laboratory**, CARLILE P. WINSLOW, *Director*; OVID M. BUTLER, *Assistant Director*; H. D. TIEMANN, *Dry Kiln Specialist*.

The forest-products laboratory is maintained in cooperation with the University of Wisconsin, at Madison. It conducts the following classes of investigations: (1) Investigations to determine the mechanical, physical, and chemical properties of forest products; (2) studies of fundamental principles underlying the seasoning and kiln drying of wood, its preservative treatment, its use in plywood and laminated construction, its use for the production of fiber products (pulp, paper, fiber board, etc.), and its use in the manufacture of alcohol, turpentine, rosin, tar, and other chemical products; (3) experimental work in cooperation with commercial operators to verify laboratory experiments on a commercial scale; (4) cooperation with individuals or companies to assist them in applying principles and processes of proved commercial value.

*Publication of Results*.—Charles R. Thomas, in charge; Ray C. Tuttle.

*Derived Products*.—L. F. Hawley, Ernest Bateman, E. C. Sherrard, Howard N. Calderwood, G. W. Blanco, Carlton Henningsen.

*Pulp and Paper*.—Otto Kress, Sidney D. Wells, C. L. Bachelder, Rudolph H. Grabow, V. P. Edwardes, Shirley C. Brayton, C. J. Humphrey, C. Audrey Richards, M. W. Bray, Jos. A. Staidl.

*Timber Mechanics*.—J. A. Newlin, L. J. Markwardt, T. R. C. Wilcox, J. S. Mathewson, John M. Gahagan, G. E. Heck, H. S. Grenoble, R. P. A. Johnson, R. F. Luxford, C. A. Plasketf, James R. McAteer, H. L. Drake, P. M. Paine, C. V. Audlin.

*Timber Physics.*—Rolf Thelen, A. Koehler, Eloise Gerry, Gertrude Griffin, James D. Studley, M. C. Jensen, C. A. Menzel, W. K. Loughborough, A. Herman.

*Wood Preservation.*—Geo. M. Hunt, A. L. Heim, R. M. Wirka, W. L. Jones, C. A. Harrison, P. R. Hicks, T. G. Townsend, Matthew E. Dunlap, Shirley W. Allen, Alfred C. Lindauer, Frederick L. Browne, T. R. Truax, J. D. MacLean.

*Industrial Investigations.*—D. G. White.

*Pathology in cooperation with Bureau of Plant Industry.*—P. V. Siggers, E. E. Hubert.

*Laboratory Operation.*—Arthur Upson, Charles P. Juckem, B. L. Nelson, M. E. Diemer, Regina Tormey, Sarah D. Kinney, L. R. Denicke.

*Accounts and Supplies.*—O. M. Wold, W. E. Thompson.

**Forest Products,** H. S. BETTS, W. D. BRUSH, R. K. HELPHENSTINE, JR., JOHN B. CUNO, E. F. MCCARTHY, collaborator, Syracuse, N. Y.

This office studies the utilization of forest products in the various wood-using industries and brings the results of these studies to the attention of manufacturers and other wood users. It also arranges for cooperation with the War and Navy Departments in the solution of military problems involving the use of wood and other forest products, and assists other Government departments in securing the most economical and effective use of wood in the great variety of forms in which it is purchased.

**Economic Investigations,** R. V. REYNOLDS, A. H. PIERSON, C. W. BOYCE; A. B. STROUGH, collaborator, Albany, N. Y.; A. F. HAWES, collaborator, South Bend, Ind.

This office conducts economic studies of the lumber and other wood-using industries, including the character and extent of the forest resources from which they derive their supplies of raw material, present and prospective demands on these, labor and market conditions, transportation problems, forest taxation, relation between forest management and community development, etc. It also collects statistics on the production of lumber and other forest products and secures information on orders, shipments, distribution, stocks on hand, and prices.

#### Branch of Engineering.

T. W. NORCROSS, *Chief Engineer in charge.*

This branch has general supervision of engineering matters, the administration of water-power uses, and preparation of road-development plans in connection with national forest administration, and cooperates with the other branches on plans, specifications, and technical details.

**Roads,** FRANK E. BONNER, *Assistant Engineer.*

General administration and field inspection of road work under the 10 per cent appropriation, section 8 of Federal aid road act, and the Federal forest road construction act. Examination and coordination of road plans for the several States, approval of road maps, plans, and specifications, and preparation of cooperative agreements with local authorities.

**Water Power,** T. W. NORCROSS.

General administration and field inspection of water power and transmission line uses. Reports upon applications for easements affecting national forest lands. Examination of proposed alienations, eliminations, additions, and withdrawals where water power is involved.

**Forest Maps and Surveys,** FRANK E. BONNER, *Assistant Engineer*; C. A. KOLB, *Geographer*; Atlas, GRANT B. BRUCE; *Drafting*, J. M. WHITEROW; *Engineering*, T. S. BROCK; *Photography*, E. S. SHIPP.

General administration and field inspection of land, boundary, and other surveys. Establishment of standards in instruments and methods of survey. Supervision and field inspection of mapping and drafting, and maintenance of forest folios and map files.

#### Branch of Public Relations.

HERBERT A. SMITH, *Assistant Forester in charge*; C. M. BALLARD, *in charge of Publication*; W. I. HUTCHINSON, *in charge of Information*; C. A. LINDSTROM, *in charge of Exhibits and Motion Pictures*; E. BURKHOLDER, *in charge of Proofs and Farms.*

The purpose of this branch is to devise and develop means of contact with the public, to the end that the services which the Forest Service is prepared to render may be better known and more generally made use of; to promote widespread diffusion of



useful knowledge relating to forests, forestry, and forest products, through all available agencies; to direct, under the Forester, the publication policy of the Forest Service; and to see that all publications issued conform to the highest possible standards of technical excellence and practical usefulness. Particular attention is given to enlisting the interest and cooperation of the public in the prevention and control of forest fires, and in the extension of the practice of forestry by private owners. The branch also seeks to promote wide use of the national forests by directing the preparation and diffusion of information having this end in view.

The chief projects are:

(1) General supervision of the publication plans of the Service, and of all printing expenditures; editorial review of all manuscripts intended for official publication, by the department or through outside agencies; review of forms; and handling of all printing requests and other communications with the departmental Division of Publications, and of proofs.

(2) The development and execution of plans for the use in primary and secondary education of information and illustrative material concerning forestry, and the preparation of suitable material for this purpose.

(3) The collection and maintenance of photographic material for educational and illustrative purposes; the development, maintenance, and use of the lantern-slide collection; requests for authorization of public addresses and lectures by members of the Service, and records of addresses and lectures made.

(4) The development, maintenance, and use of exhibit material illustrative of forestry.

(5) Motion-picture activities of the Forest Service.

(6) Relations with the press, and the supplying of official information to or intended for newspaper and magazine writers and publishers.

### Districts.

#### DISTRICT 1.—NORTHERN DISTRICT.

Montana, northeastern Washington, northern Idaho, and northwestern South Dakota. Office, Federal Building, Missoula, Mont.

**FRED MORRELL**, *district forester*.

**District Forest Inspectors**.—C. K. McHarg, Coeur d'Alene, Idaho; J. A. Fitzwater, Sandpoint, Idaho; W. W. White, Missoula, Mont.; J. D. Warner, Kalispell, Mont.; W. B. Willey, Great Falls, Mont.

**Accounts**. John A. Urbanowicz, chief of office and fiscal agent; Chas. A. Skeels, district fiscal agent.

**Operations**. Lewis C. Stockdale, assistant district forester; G. I. Porter, executive assistant; E. F. White, forest examiner.

**Fire**.—Ellers Koch, forest examiner.

**Improvements**.—D. L. Beatty, national forest examiner; R. B. Adams, telephone engineer.

**State Cooperative Fire Protection under the Weeks Law**.—Ellers Koch.

**Maintenance**.—O. C. Bradeen.

**Forest Management**. ———, assistant district forester; M. H. Wolff and H. R.

Flint, forest examiners.

**Logging Engineering**.—J. W. Girard, U. S. Swartz, F. J. Klobucher.

**Timber Sales**.—Field supervision, C. E. Knouf, lumberman.

**Planting**.—Savenac Nursery, D. S. Olson, planting assistant; G. W. Jones, forest examiner; W. G. Wahlenburg, forest assistant, Haugan, Mont.

**Products**.—C. N. Whitney, forest examiner.

**Insect Control**.————.

**Forest Investigations**.—J. A. Larson and W. C. Lowdermilk, forest examiners.

**Grazing**.—Glen A. Smith, assistant district forester; L. C. Hurtt, grazing examiner.

**Studies**.—L. C. Hurtt, grazing examiner; H. W. Elofson and R. W. Beeson, grazing assistants.

**Land**. ———, assistant district forester.

**Claims**.—P. J. O'Brien, law examiner; F. R. Ingalsbee, mineral examiner; C. A. McElroy, land examiner.

**Land Classification**.—C. B. Swim.

**Settlement**.—R. P. Edwards.

**Status**.—J. W. Streit.

**Engineering.** G. H. Lautz, district engineer; F. E. Thieme, assistant district engineer.  
**Maps and Surveys.**—J. B. Yule, Frank J. Cool, F. E. Thieme.  
**Roads.**—G. H. Lautz, H. A. Calkins.  
**Water Power.**—E. W. Kramer.  
**Public Relations.** R. P. McLaughlin.

### National Forests.

#### IDAHO.

**Clearwater.**—Lloyd G. Hornby, forest supervisor, Orofino; P. A. Wohlen, fire assistant.  
**Coeur d'Alene.**———, forest supervisor, Coeur d'Alene; Henry Wold, deputy forest supervisor; C. C. Delevan, fire assistant; Philip Neff, lumberman; James F. Brooks, national forest examiner; Frank L. Fobey, forest assistant.  
**Kaniks.**—J. E. Ryan, forest supervisor, Sandpoint; C. R. Clark, forest examiner; Frank Foltz, fire assistant; W. J. McCarthy, forest assistant.  
**Nezperce.**—S. V. Fullaway, jr., forest supervisor, Grangeville; C. P. Fickes, deputy forest supervisor; R. N. Cunningham, fire assistant.  
**Pend Oreille.**———, forest supervisor, Sandpoint; J. E. Breen, deputy forest supervisor; R. R. Fitting, fire assistant; L. D. Dunn, forest assistant.  
**Selway.**—F. J. Jefferson, forest supervisor, Kooskia; A. J. Devan and F. T. Carroll, fire assistants.  
**St. Joe.**—W. W. Weber, forest supervisor, Coeur d'Alene; A. J. Roche, first assistant

#### MONTANA.

**Absaroka.**—Ernest W. Shaw, forest supervisor, Livingston; W. R. Johns, deputy forest supervisor.  
**Beartooth.**—R. Trevor Ferguson, forest supervisor, Billings; W. L. Lay, deputy forest supervisor; E. W. Hartwell, forest assistant.  
**Beaverhead.**—J. B. Somers, forest supervisor, Dillon; A. O. Benson, deputy forest supervisor.  
**Bitterroot.**—Mallory N. Stickney, forest supervisor, Missoula; W. M. Nagel, forest examiner; J. H. Clack, fire assistant.  
**Blackfoot.**—Eldon H. Myrick, forest supervisor, Kalispell; Remington Ellis, forest assistant.  
**Cabinet.**—H. L. Baker, forest supervisor, Thompson Falls; Howard Drake, lumberman; F. E. Brown, fire assistant.  
**Custer.**—J. C. Whitham, forest supervisor, Miles City; J. W. Stanton, deputy forest supervisor.  
**Deerlodge.**—Fay G. Clark, forest supervisor, Butte; T. A. Clapp and W. L. Baldwin, deputy forest supervisors; J. C. Ketrledge, forest examiner.  
**Flathead.**—Kenneth Wolfe, forest supervisor, Kalispell; C. S. Webb and A. L. Rossman, lumbermen; C. H. Hash and H. L. Redlingshafer, fire assistants.  
**Gallatin.**—Burr W. Clark, forest supervisor, Bozeman; J. B. Taylor, forest examiner.  
**Helena.**—Arthur H. Abbott, forest supervisor, Helena; W. I. White, forest assistant.  
**Jefferson.**—A. C. Adams, forest supervisor, Great Falls.  
**Kootenai.**—Leslie F. Vinal, forest supervisor, Libby; C. E. Sutton, forest examiner; J. K. Dwinelle, fire assistant; R. A. Fletcher, forest assistant.  
**Lewis and Clark.**—Edward J. Yeomans, forest supervisor, Great Falls; W. M. Rush, deputy forest supervisor.  
**Lolo.**—A. M. Baum, forest supervisor, Missoula; T. P. Malloy, forest examiner; R. A. Phillips, fire assistant.  
**Madison.**—W. J. Derrick, forest supervisor, Sheridan (WU); H. G. Ade, deputy forest supervisor.  
**Missoula.**———, forest supervisor, Missoula (WU, P, C); Lee Stratton, deputy forest supervisor; Rutledge Parker, forest examiner.

#### DISTRICT 2.—ROCKY MOUNTAIN DISTRICT.

Colorado, Wyoming, South Dakota, Nebraska, northern Michigan, and northern Minnesota. Office, New Federal Building, Denver, Colo.

**ALLEN S. PECK**, district forester.

**Accounts.** Q. R. Craft, chief of office and fiscal agent; Joel I. Buckner, district fiscal agent.



**Operation.** C. M. Granger, assistant district forester; John McLaren, fire protection; H. R. Kyle, telephone engineer and improvements; Peter Keplinger, training.  
*State Cooperative Fire Protection under the Weeks Law.*—John McLaren.  
**Maintenance.**—C. A. Neeper.  
**Forest Management.** M. W. Thompson, assistant district forester; J. A. Donery, lumberman.  
*Timber Surveys and Insect Control.*—W. J. Pearce, forest examiner.  
**Planting.**—Fred R. Johnson.  
**Grazing.** John H. Hatton, assistant district forester.  
*Studies.*—Lynn H. Douglas, inspector of grazing; Jesse M. Mann, grazing assistant.  
**Lands.** C. J. Stahl, assistant district forester; Thos. M. Moorman, assistant; Crosby A. Hoar, classification and exchange; J. B. Cammann, mineral examiner; Arthur H. Carhart, recreation engineer.  
**Engineering.** Fred D. Mendenhall, district engineer; J. L. Brownlee, assistant district engineer.  
*Maps and Surveys.*—J. Burgess, H. E. Sealing.  
*Roads.*—Fred D. Mendenhall, J. L. Brownlee.  
*Water Power.*—Fred D. Mendenhall.  
**Public Relations.** H. N. Wheeler, in charge.

#### National Forests.

#### COLORADO.

*Arapaho.*—Alve L. Richey, forest supervisor, Hot Sulphur Springs.  
*Battlement.*—John W. Spencer, forest supervisor, Grand Junction.  
*Cochetopa.*—Fred B. Agee, forest supervisor, Saguache; Clarence E. Taylor, forest examiner.  
*Colorado.*—H. N. Wheeler, forest supervisor, Fort Collins; M. J. Sweeney, forest examiner.  
*Durango-San Juan.*—H. Earl French, forest supervisor, Durango; Charles B. Mack, forest supervisor.  
*Gunnison.*—William R. Kreutzer, district forest inspector, Gunnison; Charles Steuart, forest examiner.  
*Holy Cross.*—Harry H. French, forest supervisor, Glenwood Springs; G. M. Hunter, deputy forest supervisor.  
*Leadville.*—Harold L. Borden, forest supervisor, Leadville; Lee P. Brawn, forest assistant.  
*Montezuma.*—A. F. C. Hoffman, forest supervisor, Mancos; Robert H. Easterbrooks, forest examiner.  
*Pike.*—Ress Philips, district forest inspector, Denver; William R. Fraser, deputy forest supervisor; Everard S. Keithley, forest examiner; Jacob Roeser, jr., forest assistant, Monument Nursery, W. H. Schrader, forest planting assistant, Monument.  
*Rio Grande.*—R. E. Clark, district forest inspector, Monte Vista; Walter F. Bowers, deputy forest supervisor.  
*Routt.*—Ray Peck, forest supervisor, Steamboat Springs; H. D. Cochran, forest assistant.  
*San Isabel.*—Albin G. Hamel, forest supervisor, Westcliffe; S. E. Doering, deputy forest supervisor.  
*Uncompahgre.*—Dwight S. Jeffers, forest supervisor, Delta; Leslie Brawnell, deputy forest supervisor.  
*White River.*—James A. Blair, forest supervisor, Glenwood Springs; Theodore Krueger, forest examiner.

#### MICHIGAN.

*Michigan.*—Huber C. Hilton, forest supervisor, East Tawas. Beal Nursery, East Tawas.

#### MINNESOTA.

*Minnesota.*—G. E. Marshall, forest supervisor, Cass Lake. Cass Lake Nursery.  
*Superior.*—C. A. Dahlgren, forest supervisor, Ely; Robert G. Schreck, forest examiner.

#### NEBRASKA.

*Nebraska.*—Jay Higgins, forest supervisor, Halsey; Morton Nursery, Joseph A. Sweeney, Nenzil; Bessey Nursery, Harry C. Turner, forest planting assistant, Halsey.

## SOUTH DAKOTA.

*Black Hills.*—George A. Duthie, forest supervisor, Deadwood; Thos. H. Gill, deputy forest supervisor; N. E. Peterson, lumberman.

*Harney.*—James F. Conner, forest supervisor, Custer; John V. Leighon, forest examiner.

## WYOMING.

*Bighorn.*—E. W. Tinker, forest supervisor, Sheridan; Andrew G. Stockwell, deputy forest supervisor.

*Hayden.*—James Blackhall, forest supervisor, Encampment.

*Medicine Bow.*—Earl S. Peirce, district forest inspector, Laramie; K. J. Helmick, lumberman; Jas. M. Wally, forest assistant.

*Shoshone.*—Andrew Hutton, deputy forest supervisor, Cody; Ralph R. Shaw, national forest examiner.

*Washakie.*—Arthur M. Cook, forest supervisor, Lander; Frank E. McGrew, lumberman.

## DISTRICT 3.—SOUTHWESTERN DISTRICT.

Arizona and New Mexico. Office, Gas and Electric Building, Albuquerque, N. Mex.

FRANK C. W. POOLER, *district forester.*

*District Forest Inspectors.*—Joseph C. Kircher, T. T. Swift, Safford, Ariz.; Frank E. Andrews, Santa Fe, N. Mex.; W. H. Goddard, Roosevelt, Ariz.

**Accounts.** Albert Morris, chief of office and fiscal agent; S. H. Busch, district fiscal agent.

**Operation.** Aldo Leopold, assistant district forester, in charge; James F. Mullen, national forest examiner, assistant chief; L. V. Slonaker, telephone engineer.

*Maintenance.*—H. B. Hammond.

**Forest Management.** R. E. Marsh, assistant district forester; D. M. Lang, lumberman; Quincy Randles, forest examiner.

*Investigations.*—Marinus Westveld, forest examiner; W. H. Long, consulting pathologist, Albuquerque, N. Mex.

**Grazing.** John Kerr, assistant district forester; Paul H. Roberts, inspector of grazing.

*Studies.*—M. W. Talbot, grazing examiner.

*Reconnaissance.*—C. K. Cooperrider, grazing examiner; H. O. Cassidy and M. J. Culley, grazing assistants.

**Lands.** John D. Jones, assistant district forester; M. M. Cheney, national forest examiner. Classification: Rex King and H. D. Burrall, forest examiners.

**Engineering.** C. A. Long, district engineer.

*Maps and Surveys.*———, F. E. Landon, L. R. Mercer.

*Roads.*—C. A. Long. Trail surveys and minor road construction: J. C. Mulder, R. L. Hughes.

*Water Power.*—C. A. Long.

**Public Relations and Game Protection.** Edward P. Ancona, forest examiner.

*National Forests.*

## ARIZONA.

*Apache.*—Robert J. Selkirk, forest supervisor, Springerville; Alfred W. Voight, deputy forest supervisor.

*Coconino.*—Edward G. Miller, forest supervisor, Flagstaff; J. A. Adams and Kenner C. Kartchner, deputy forest supervisors; Robert F. Rhinehart, lumberman; Leonard R. Lessel, national forest examiner; James W. Girdner, deputy forest supervisor.

*Coronado.*—Hugh G. Calkins, forest supervisor, Tucson; F. L. W. Grubb, deputy forest supervisor; Stanley F. Wilson, forest examiner.

*Crook.*—T. T. Swift, forest supervisor, Safford.

*Prescott.*—H. Basil Wales, forest supervisor, Prescott; J. C. McNelty, forest supervisor.

*Sitgreaves.*—T. C. Hoyt, forest supervisor, Snowflake.

*Tonto*.—W. H. Goddard, district forest inspector, Roosevelt; J. H. Sizer, deputy forest supervisor.

*Tusayan*.—James A. Scott, forest supervisor, Williams; George W. Kimball, forest examiner; Wayne Russell, lumberman.

## NEW MEXICO.

*Carson*.—Earl W. Loveridge, forest supervisor, Taos; Carroll R. Dwine, deputy forest supervisor.

*Datil*.—Ausburn H. Douglas, forest supervisor, Magdalena; Robert Munro, national forest examiner.

*Gila*.—Frederic Winn, forest supervisor, Silver City; L. J. Putsch, forest supervisor; H. Norton Cope, deputy forest supervisor.

*Lincoln*.—O. P. Arthur, forest supervisor, Alamogordo; Simeon Strickland, lumberman; William J. Anderson, national forest examiner.

*Manzano*.—Ward Shepard, forest supervisor, Albuquerque; Charles H. Kissam, national forest examiner.

*Santa Fe*.—Frank E. Andrews, district forest inspector, Santa Fe; R. L. De Camp, forest supervisor; Gordon T. Backus, forest examiner.

## DISTRICT 4.—INTERMOUNTAIN DISTRICT.

Utah, southern Idaho, western Wyoming, eastern and central Nevada, and northwestern Arizona. Office, Forest Service Building, Ogden, Utah.

R. H. RUTLEDGE, *district forester*.

**Accounts.** Homer A. Seip, chief of office and fiscal agent; A. C. Wycoff, district fiscal agent.

**Operation.** Chas. D. Simpson, assistant district forester; Carl B. Arentson, forest supervisor, executive assistant; R. B. Adams, telephone engineer.

*State Cooperative Fire Protection under the Weeks Law*.—Chas. D. Simpson.

*Maintenance*.—W. B. Crites.

**Forest Management.** C. B. Morse, assistant district forester; S. S. Stewart, forest examiner.

*Planting*.—Cottonwood Nursery, N. J. Fetherolf, planting assistant in charge, Sugarhouse, Utah.

**Grazing.** C. N. Woods, assistant district forester; Ernest Winkler, inspector of grazing.

*Studies*.—D. A. Shoemaker, grazing examiner.

**Land.** R. E. Gery, acting assistant district forester; W. B. Rice, in charge of entry surveys; S. B. Locke, forest examiner, fish and game.

**Research.** F. S. Baker, forest examiner.

**Engineering.** J. P. Martin, district engineer; F. J. Ryder, administrative assistant.

*Maps and Surveys*.—

*Roads*.—J. P. Martin, H. G. McPheters, R. A. Brown, and O. W. Torgeson.

*Water Power*.—J. P. Martin, in charge.

**Public Relations.** James F. Scott.

*National Forests.*

## ARIZONA.

*Kaibab*.—John C. Roak, forest supervisor, Kanab, Utah.

## IDAHO.

*Boise*.—E. Grandjean, district forest inspector, Boise; W. M. Campbell, deputy forest supervisor.

*Caribou*.—Earl C. Sanford, forest supervisor, Montpelier; Robert W. Strong, deputy forest supervisor.

*Challis*.—David Laing, forest supervisor, Challis.

*Idaho*.—Walter G. Mann, forest supervisor, McCall; Andrew Casner, deputy forest supervisor.

*Lemhi*.—Chas. F. Evans, forest supervisor, Mackay.

*Minidoka*.—R. D. Garver, forest supervisor, Burley; J. W. Stokes, deputy forest supervisor.

*Payette*.—Guy B. Mains, district forest inspector, Emmett; F. S. Moore, forest supervisor; Francis Wallis, deputy forest supervisor.

*Salmon*.—S. C. Scribner, forest supervisor, Salmon; Ernest A. Renner, deputy forest supervisor.

*Sawtooth*.—M. S. Benedict, district forest inspector, Hailey.

*Targhee*.—Sam'l W. Stoddard, forest supervisor, St. Anthony; John N. Kinney and Samuel Steele, jr., deputy forest supervisors.

*Weiser*.—Lyle F. Watts, forest supervisor, Weiser; T. V. Pearson, deputy forest supervisor.

## NEVADA.

*Humboldt*.—C. E. Favre, district forest inspector, Elko; Oscar W. Mink, deputy forest supervisor.

*Nevada*.—Alexander McQueen, forest supervisor, Ely.

*Toiyabe*.—Jas. W. McGowan, forest supervisor, Austin.

## UTAH.

*Ashley*.—W. M. Anderson, forest supervisor, Vernal.

*Cache*.—E. C. Shepard, district forest inspector, Logan; Edmund B. S. Spencer, forest supervisor.

*Dixie-Sevier*.—Wm. M. Mace, forest supervisor, Cedar City; James E. Gurr, deputy forest supervisor.

*Fishlake-Fillmore*.—John Raphael, district forest inspector, Richfield; C. A. Mattsson, forest supervisor; A. M. Woodbury, deputy forest supervisor.

*La Sal*.—Chas. DeMoisey, jr., forest supervisor, Moab.

*Manti*.—J. W. Humphrey, forest supervisor, Ephraim.

*Powell-Sevier*.—Geo. H. Barney, forest supervisor, Widtsoe.

*Uinta*.—W. W. Blakeslee, forest supervisor, Provo; Wallace M. Riddle, deputy forest supervisor.

*Wasatch*.—Dana Parkinson, forest supervisor, Salt Lake City; David A. Arrivee, forest supervisor.

## WYOMING.

Lee E. Cooper, forest supervisor, Pinedale; E. E. McKee, deputy forest supervisor.

*Teton*.—A. G. McCain, district forest inspector, Jackson.

*Wyoming-Bridger*.—Charles A. Beam, forest supervisor, Kemmerer; E. E. McKee, deputy forest supervisor; Lewis B. Koch, lumberman.

## DISTRICT 5.—CALIFORNIA DISTRICT.

California and southwestern Nevada. Office, Terry Building, San Francisco, Calif.

PAUL G. REDINGTON, district forester.

*District Forest Inspectors*.—R. H. Charlton, Los Angeles, Calif.; D. N. Rogers, Quincy, Calif.; R. L. P. Bigelow, Nevada City, Calif.; M. A. Benedict, Northfork, Calif.

*Accounts*. A. W. Smith, chief of office and fiscal agent; P. A. Tucker, district fiscal agent.

*Operation*. Robert L. Deering, assistant district forester.

*Finance*.—L. W. Hess, national forest inspector.

*Personnel and Inspection*.—Paul P. Pitchlynn, national forest examiner.

*Fire*.—E. I. Kotok, forest examiner.

*State Cooperative Fire Protection under the Weeks Law*.—E. I. Kotok, G. M. Homans. State forester, Sacramento, Calif., collaborator.

*Law Enforcement*.—C. V. Brereton, national forest examiner.

*Maintenance*.—E. H. Schmieder.

*Forest Management*. T. D. Woodbury, assistant district forester.

*Logging Engineering*.—Perry Emigh and J. H. Price.

*Timber Sales*.—J. C. Elliott, lumberman.

*Timber Surveys*.—O. M. Evans, forest examiner.

*Forest Pathology*.—E. P. Meinecke, consulting pathologist; H. G. Lachmund, Charles D. Meissner, and Willis W. Wagener, assistants; Frank Saltzman, superintendent, Experiment Station.

*Research*. S. B. Show, forest examiner; Duncan Dunning, forest examiner.

*Grazing*. C. E. Rachford, assistant district forester.

*Land*. L. A. Barrett, assistant district forester; George Miller, national forest examiner.

*Mineral Examination, Land Classification, and Entry Surveys*.—W. H. Friedhoff, mineral examiner.



**Products.** C. L. Hill, forest examiner; Carl A. Kupfer, collaborator.

**Engineering.** F. H. Fowler, district engineer; J. C. Dort, assistant district engineer.

*Maps and Surveys.*—S. W. Wynne, S. N. Stoner, H. A. Sedelmeyer.

*Roads.*—F. H. Fowler, J. C. Dort, F. D. Bowlus. Minor Roads, Trails, and Improvements: S. W. Wynne, C. E. Jordan.

*Water Power.*—F. H. Fowler.

*Telephone Engineering.*—F. H. Hafley, telephone engineer.

**Public Relations.** R. F. Hammatt, assistant district forester; Paul J. Fair, exhibits.

#### *National Forests.*

#### CALIFORNIA.

*Angeles.*—Shirley W. Allen, forest supervisor, Los Angeles.

*California.*—J. D. Coffman, forest supervisor, Alder Springs; B. H. Mace, deputy forest supervisor.

*Cleveland.*—S. A. Boulden, forest supervisor, San Diego.

*Eldorado.*—E. F. Smith, forest supervisor, Placerville.

*Inyo.*—Thos. J. Jones, forest supervisor, Bishop; Herschel Simpson, grazing.

*Klamath.*—W. A. Huestis, forest supervisor, Yreka; Harry R. Saxton, forest assistant; John R. Berry, scaler.

*Lassen.*—C. E. Dunston, forest supervisor, Red Bluff; T. C. West, deputy forest supervisor; A. E. Wieslander, forest examiner; Vance S. Brown, scaler.

*Modoc.*—W. G. Durbin, forest supervisor, Alturas; Wm. S. Brown, deputy forest supervisor; Roscoe Weaver, forest examiner; Leland S. Smith and Fred P. Cronemiller, grazing examiners.

*Plumas.*—D. N. Rogers, district forest inspector, Quincy; Richard A. Colgan, jr., forest examiner; George R. Orr, lumberman; W. E. Jotter, forest assistant.

*Santa Barbara.*—Thos. W. Sloan, forest supervisor, Santa Barbara; Clarence Wiley, national forest inspector.

*Sequoia.*—F. P. Cunningham, forest supervisor, Porterville; Wm. F. Derby, deputy forest supervisor; Lee Slinkard, grazing.

*Shasta.*—J. R. Hall, forest supervisor, Sisson; C. A. Chamberlain, deputy forest supervisor, fire protection; Belknap C. Goldsmith, forest examiner; L. N. Lorenzen, grazing examiner; John S. Everett, forest assistant; J. B. Fletcher, scaler.

*Sierra.*—M. A. Benedict, district forest inspector, Northfork; Burnett Sanford, forest assistant.

*Stanislaus.*—J. V. Wulff, forest supervisor, Sonora; J. E. Elliott, deputy forest supervisor; M. R. Brundage, forest assistant.

*Tahoe.*—R. L. P. Bigelow, district forest inspector, Nevada City; Geo. W. Lyons, forest examiner; Fred J. Dooley, scaler.

*Trinity.*—E. V. Jotter, forest supervisor, Weaverville; John T. Gray, deputy forest supervisors.

#### NEVADA.

*Mono.*—Wm. M. Maule, forest supervisor, Minden.

#### DISTRICT 6.—NORTH PACIFIC DISTRICT.

Washington, Oregon, and Alaska. Office, Post Office Building, Portland, Oreg.

GEO. H. CRECIL, *district forester.*

**Accounts.** A. H. Cousins, chief of office and fiscal agent; H. J. Weil, district fiscal agent.

**Operation.** A. O. Waha, assistant district forester; Shirley Buck, national forest inspector.

*Fire Protection.*—W. B. Osborne, jr., forest examiner.

*Improvement.*—M. L. Merritt, forest examiner.

*Telephone Engineering.*—C. M. Allen, telephone engineer.

*Law Enforcement.*—T. M. Talbott, national forest examiner.

*Inspection of Protection of Oregon & California Railroad Lands.*—R. H. Chapler, forest examiner.

*State Cooperative Fire Protection under the Weeks Law.*—R. H. Chapler.

*Maintenance.*—H. G. Whitney.

**Forest Management.** Fred Ames, assistant district forester.

*Timber Sales.*—Thornton T. Munger, forest examiner.

*Logging Engineering.*—Bruce E. Hoffman, logging engineer; Geo. L. Drake and B. F. Heintzleman, forest examiners.

- Check Scaling.*—E. C. Erickson, lumberman.  
*Timber Surveys and Working Plans.*—C. J. Conover and George A. Bright, forest examiners.  
*Insect Control.*—A. J. Jacnicke, forest examiner.  
*Planting and Forest Investigations.*—J. F. Kummel, W. H. Leve, and R. H. Weidman, forest examiners.  
**Grazing.** E. N. Kavanagh, assistant district forester; J. L. Peterson, grazing examiner.  
*Studies.*—D. C. Ingram, grazing examiner.  
**Lands.** C. J. Buck, assistant district forester.  
*Claims.*—W. M. H. Woodward, mineral examiner.  
*Land Classification.*—A. H. Wright and Wellman Holbrook (Alaska), national forest examiners.  
*Land Exchanges.*—Ryle Teed and Asher Ireland, national forest examiners.  
**Engineering.** Philip H. Dater, district engineer; D. V. Stroop, assistant district engineer.  
*Maps and Surveys.*—H. D. Foster, forest examiner; George W. Root.  
*Roads.*—Philip H. Dater, Cecil A. Lord.  
*Water Power.*—E. W. Kramer.  
**Products.** W. H. Gibbons, forest examiner; C. W. Gould, forest examiner, Portland; C. W. Zimmerman and H. C. Stinson, engineer and assistant engineer in forest products, Seattle.  
**Public Relations.** John D. Guthrie.

### National Forests.

#### OREGON.

- Cascade.*—N. F. Macduff, forest supervisor, Eugene; Harvey E. Vincent, deputy forest supervisor; E. H. Hall, forest examiner.  
*Crater.*—H. B. Rankin, forest supervisor, Medford; Fred A. Matz, national forest examiner; H. M. Johnson, forest examiner; J. D. Holst and Geo. H. West, scalers.  
*Deschutes.*—H. L. Plumb, forest supervisor, Bend; W. J. Sproat, forest examiner; F. V. Horton, grazing examiner.  
*Fremont.*—Gilbert D. Brown, forest supervisor, Lakeview.  
*Malheur.*—Wm. W. Cryder, forest supervisor, John Day.  
*Ochoco.*—V. V. Harpham, forest supervisor, Prineville.  
*Oregon.*—T. H. Sherrard, district forest inspector, Portland; Carl B. Neal, forest supervisor; A. G. Jackson and W. J. Paeth, forest examiners.  
*Santiam.*—C. C. Hall, forest supervisor, Albany.  
*Siskiyou.*—E. H. MacDaniels, forest supervisor, Grants Pass; H. A. Haefner, forest examiner; S. A. Moore, scaler.  
*Siustlaw.*—Ralph S. Shelley, forest supervisor, Eugene; A. R. Wilcox, forest examiner.  
*Umatilla.*—John C. Kuhns, forest supervisor, Pendleton; R. A. Bottcher, deputy forest supervisor; Geo. Donaldson, scaler.  
*Umpqua.*—W. F. Ramsdell, forest supervisor, Roseburg; George Bonebrake, deputy forest supervisor.  
*Wallowa.*—Nelson J. Billings, forest supervisor, Wallowa.  
*Whitman.*—R. M. Evans, district forest inspector; I. E. Jones, forest supervisor, Baker; J. F. Irwin, forest supervisor; C. W. Waterbury, lumberman; Walter L. Dutton, grazing examiner; Harry Gisborne, forest assistant.

#### WASHINGTON.

- Chelan.*—P. T. Harris, forest supervisor, Okanogan; G. E. Mitchell, deputy forest supervisor, Chelan.  
*Columbia.*—T. H. Brundage, district forest inspector, Portland, Oreg.; H. M. White, national forest inspector.  
*Colville.*—C. C. Reid, forest supervisor, Republic; Lawrence B. Pagter, forest examiner.  
*Okanogan.*—P. T. Harris, forest supervisor, Okanogan.  
*Olympic.*—R. L. Fromme, district forest inspector; O. F. Erickson, forest supervisor, Olympia; A. A. Griffin, forest examiner; Earle H. McArdle, scaler.  
*Rainier.*—G. F. Allen, forest supervisor, Tacoma; E. J. Fenby and Geo. E. Griffiths, deputy forest supervisors; F. B. Kellogg, forest examiner.  
*Snoqualmie.*—W. G. Weigle, district forest inspector; Lewis A. Treen, jr., forest supervisor, Seattle; Edward J. Hanzlik, forest examiner; E. E. Whitaker, scaler.  
*Washington.*—C. H. Park, forest supervisor, Bellingham; R. L. Campbell, deputy forest supervisor.

*Wenaha*.—John C. Kuhns, forest supervisor, Walla Walla.

*Wenatchee*.—A. H. Sylvester, forest supervisor, Wenatchee; F. B. Lenzie, grazing examiner; Francis A. Varo, scaler.

#### DISTRICT 7.—EASTERN DISTRICT.

Alabama, Arkansas, Florida, Georgia, Oklahoma, South Carolina, North Carolina, Tennessee, Virginia, West Virginia, New Hampshire, Maine, Porto Rico. Office, Atlantic Building, Washington, D. C.

F. W. REED, district forester.

**Accounts.** J. H. Kerrick, district fiscal agent.

**Operation—Engineering.** H. O. Stabler, assistant district forester; John W. Fox, assistant engineer.

**Forest Management.** I. F. Eldredge, assistant district forester.

*Logging Engineering.*—E. V. Clark.

**Grazing—Lands.** F. W. Reed, *district forester*.

*Acquisition.*—Rudolph Dieffenbach, forest inspector; E. D. Fletcher, national forest examiner.

*Land Exchange.*—W. F. Hill, national forest examiner.

#### National Forests.

##### ALABAMA.

*Alabama*.—Burley M. Lufburrow, acting forest supervisor, Moulton.

##### ARKANSAS.

*Arkansas*.—Chas. A. Plymale, forest supervisor, Hot Springs; Wm. E. White, deputy forest supervisor; J. A. Bateman and H. A. Regan, national forest examiners.

*Ozark*.—Ben F. Vaughan, forest supervisor, Russellville; R. C. Huey and Wm. P. Dale, national forest examiners.

##### FLORIDA.

*Florida*.—L. L. Bishop, district forest inspector, Pensacola.

##### NEW HAMPSHIRE.

*White Mountain*.—J. J. Fritz, forest supervisor, Gorham; H. R. Currier, deputy forest supervisor; H. S. Davis, forest examiner; S. H. Thompson, forest examiner; K. E. Kimball, national forest examiner; F. A. Gardner, examiner of surveys.

##### NORTH CAROLINA.

*Nantahala*.—R. W. Shields, forest supervisor, Franklin; S. M. Sleanklin, deputy forest supervisor; C. E. Beaumont, forest examiner; W. N. Sloan and A. A. Riemer, examiners of surveys.

*Pisgah* (includes Boone National Forest, north half of Nantahala purchase area, and Pisgah National Forest.—Verne Rhoades, district forest inspector, Asheville; Ira T. Yarnall, forest examiner; Jas. Denman, examiner of surveys.

##### OKLAHOMA.

*Wichita*.—Frank Rush, forest supervisor, Cache.

##### PORTO RICO.

*Luquillo*.—E. Murray Bruner, forest examiner, Rio Piedras.

##### SOUTH CAROLINA.

*Nantahala*.—See North Carolina.

##### TENNESSEE.

*Cherokee*.—H. G. Spahr, forest supervisor, Athens; Rezin E. Pidgeon, examiner of surveys.

*Unaka*.—H. L. Russell, forest supervisor, Johnson City; W. E. Hedges, national forest examiner; C. F. Muzzey, examiner of surveys.

## VIRGINIA.

*Natural Bridge*.—J. H. Fahrenbach, forest supervisor, Buena Vista; H. M. Sears, forest examiner; A. R. Kinney and P. G. Jenney, examiners of surveys.

*Shenandoah*.—S. H. Marsh, district forest inspector, Harrisonburg; Wm. H. Stoneburner, deputy forest supervisor; E. R. Conrad, examiner of surveys.

## WEST VIRGINIA.

*Monongahela*.—H. L. Johnson, forest supervisor, Elkins; W. H. Sullivan, examiner of surveys.

## DISTRICT 8.—ALASKA DISTRICT.

Alaska. Office, Ketchikan, Alaska.

C. H. FLORY, *district forester*.

**Accounts.** Louis King, special fiscal agent.

*National Forests.*

## ALASKA.

*Chugach*.—C. T. Beach, forest supervisor, Cordova.

*Tongass*.—Charles T. Gardner, forest supervisor, Ketchikan; B. F. Heintzleman and Robert A. Zeller, forest examiners.

**BUREAU OF PLANT INDUSTRY.**

*Physiologist and Pathologist and Chief of Bureau*, WILLIAM A. TAYLOR; *Physiologist and Associate Chief of Bureau*, KARL F. KELLERMAN; *Assistant to the Chief*, JAMES E. JONES; *Officer in Charge of Publications*, J. E. ROCKWELL; *Librarian*, EUNICE R. OEBERLY; *Officer in Charge of Records*, W. P. COX.

The Bureau of Plant Industry studies plant life in all its relations to agriculture. The scientific work of the bureau is divided into 31 distinct groups, over each of which is placed a scientifically trained officer, who reports directly to the chief and assistant chief of the bureau. The work of the bureau is conducted on the project plan, the investigations under each of the offices being arranged by group projects consisting of closely related lines of work. These group projects are further divided into subprojects.

**Laboratory of Plant Pathology.** ERWIN F. SMITH, *Pathologist in charge*.

This is the central working laboratory for all of the pathological investigations conducted by the bureau. Studies of the diseases of a wide variety of crop plants are made in the laboratory and supplemented by field investigations and experimentation.

*Scientific staff*.—R. E. B. McKenney, Nellie A. Brown, and Frederick V. Rand, pathologists; Florence Hedges, Lucia McCulloch, Mary K. Bryan, Charlotte Elliott, and Helen E. Fox, assistant pathologists; Harry Braun and Lillian C. Cash, scientific assistants; Agnes J. Quirk, assistant in pathological laboratory; James F. Brewer, artist; Edna H. Fawcett, laboratory aid; Loren Burrit, field aid.

**Plant-Disease Survey.** GEORGE R. LYMAN, *Pathologist in charge*.

This office records the geographical distribution, annual prevalence, and rate of spread of diseases of economic plants in the United States, and estimates the amount of loss occasioned by them; studies epidemics and unusual outbreaks of disease in relation to various environmental factors; gathers data on the resistance and susceptibility of varieties to disease, the practical effectiveness of various control methods, and other points of value in disease-control work. All data collected is issued in the form of reports and bulletins. The office maintains close cooperative relations with pathologists and agriculturists generally.

*Scientific staff*.—Royal J. Haskell and G. Hamilton Martin, jr., plant pathologists.

**Pathological Collections.** FLORA W. PATTERSON, *Mycologist in charge*.

This office maintains economic collections of pathological and related material; identifies edible and poisonous fungi; studies problems in entomogenous fungi; conducts taxonomic work in cooperation with various offices of the bureau; and makes miscellaneous identifications. In addition to securing new species of pathological fungi and systematically inserting them where they may be readily available for study, card indexes are



maintained which refer to descriptions of fungi or relate to mycological or pathological subjects.

*Scientific staff.*—Vera K. Charles, assistant mycologist; Anna E. Jenkins and William W. Diehl, scientific assistants; Edith K. Cash, botanical translator.

**Fruit-Disease Investigations.** MERTON B. WAITE, *Pathologist in charge.*

These studies deal with diseases of fruits and fruit trees and methods of controlling or preventing them. They cover deciduous orchard fruits, citrus fruits, small fruits, and the cultivated nuts. Field demonstrations of new methods of disease control form an important part of the work. Investigations of decay and spoilage of fruits in transit, storage, and on the market are included. Pathological inspection of fruits during marketing is carried on in cooperation with the Bureau of Markets.

*Scientific staff.*—C. L. Shear, Charles Brooks, H. R. Fulton, John W. Roberts, W. S. Ballard, Neil E. Stevens, B. O. Dodge, D. F. Fisher, J. S. Cooley, J. R. Winston, and Clara H. Hasse, pathologists; Juan B. Demaree, R. B. Wilcox, Eugene A. Siegler, Angie M. Beckwith, Ruth Colvin, John J. Bowman, and Lois M. Clency, scientific assistants; Leslie Pierce, assistant in spraying experiments; J. M. Shull, botanical artist; Ellen A. Fenner, laboratory assistant; R. B. Piper, field and laboratory aid.

**Citrus-Canker Eradication.** Directed by Associate Chief of Bureau.

In cooperation with the Southern States in which citrus fruits are grown, work is being conducted for the purpose of eradicating citrus canker, by the thorough inspection of nurseries and citrus groves, formalin treatment of infected soil, protective spraying of groves exposed to infection, and destruction of diseased trees. The following-named State officials are in local charge of the cooperative campaigns in their respective States, and approximately 110 agents are engaged in the work: Wilmon Newell, State plant commissioner, Florida; G. C. Starcher, State horticulturist, Alabama; W. E. Anderson, Louisiana; R. W. Harned, State entomologist, Mississippi; J. M. Del Curto, plant pathologist for Texas, State department of agriculture, Texas.

**Investigations in Forest Pathology.** HAVEN METCALF, *Pathologist in charge.*

This office studies various diseases affecting forest trees and timber, as well as ornamental and shade trees. The work is conducted in close cooperation with the Forest Service.

*Scientific staff.*—Reginald H. Colley, George G. Hedcock, Perley Spaulding, Emile P. Meinecke, William H. Long, Nathaniel O. Howard, and John S. Boyce, pathologists; J. Franklin Collins and James R. Weir, forest pathologists; Ellsworth Bethel, pathologist in forest-tree rust investigations; George F. Gravatt, assistant pathologist; Ernest E. Hubert, Glenn G. Hahn, and Paul V. Siggers, scientific assistants; Rush P. Marshall, pathological inspector; Charles D. Meissner and Frank L. Saltzman, superintendents of forest pathological field stations; Harry G. Lachmund, Minnie W. Taylor, Annie E. Rathbun, Willis W. Wagener, Arthur S. Rhoads, and Alma May Waterman, assistants in forest pathology.

**Blister-Rust Control.** SAMUEL B. DETWIMER, *Forest Pathologist in charge.*

This office is engaged in the control of white-pine blister rust in cooperation with the States where white pine is an important timber crop. Pine stands in infected regions are protected by destroying wild and cultivated currant and gooseberry bushes (the alternate hosts of this disease) within 200 to 300 yards of the pine. Educational work with pine owners, demonstrations, and experiments to determine the cheapest and most effective methods are an important part of this project. Scouting for infections, tracing nursery shipments, and searching for violations of the Federal quarantine prohibiting shipment of blister-rust host plants are done where the disease has not yet appeared. This is especially the case in the States west of the Great Plains, where the blister rust, if introduced, would work great havoc in the extensive white-pine and sugar-pine forests. The following-named State officials are in local charge of cooperative work where funds are expended in local control on a dollar-for-dollar basis: Forrest H. Colby, forest and land commissioner, Maine; E. S. Brigham, commissioner of agriculture, Vermont; A. W. Gilbert, commissioner of agriculture, Massachusetts; J. H. Foster, State forester, New Hampshire; John J. Dunn, secretary board of agriculture, Rhode Island; E. H. Jenkins, director agricultural experiment station, Connecticut; George D. Pratt, commissioner conservation commission, New York; A. G. Ruggles, State entomologist, Minnesota; C. P. Norgard, commissioner of agriculture, Wisconsin.

*Scientific staff.*—James F. Martin, Alonzo B. Brooks, Gilbert B. Posey, Edmund C. Filler, and Roy G. Pierce, forest pathologists; Thomas E. Francis, Stephen W. Wyckoff, Raymond Fogelman, and Joseph L. Richards, assistant pathologists; Charles R. Stil-

linger, scientific assistant; William J. Endersbee, Walter O. Frost, Leslie N. Goodding, William S. Moir, Henry N. Putnam, William E. Pickler, James E. Riley, jr., George A. Root, Lewis W. Hodgkins, Charles H. Johnson, James D. Winter, and John M. Corliss, assistants in white-pine blister-rust control; Leonard E. Newman, Herman J. Ninman, and Carl C. Perry, agents.

**Cotton, Truck, and Forage Crop Disease Investigations.** W. A. ORTON, *Pathologist in charge.*

These investigations cover diseases of garden vegetables, including field demonstrations of methods of control and prevention; diseases of cotton, of cowpeas and other forage crops, and of related plants.

*Scientific staff.*—Howard A. Edson, William W. Gilbert, Leonard L. Harter, Ivan C. Jagger, John C. Walker, Howard G. MacMillan, Eugene S. Schultz, Michael Shapovalov, George H. Godfrey, and John I. Lauritzen, pathologists; Frederick J. Pritchard, physiologist; Fred R. Jones, pathologist in charge of forage-crop disease investigations; Sears P. Doolittle, David G. Milbrath, Glen B. Ramsey, James L. Weimer, Charles Drechsler, Wilber Brotherton, jr., and Gustav A. Meckstroth, assistant pathologists; Wayland B. Clark, biochemist; Ernst Artschwager and William S. Porte, scientific assistants; Sylvia L. Graenicher, physical laboratory helper.

**Crop Physiology and Breeding Investigations.** WALTER T. SWINGLE, *Physiologist in charge.*

This office investigates the physiology of crop plants with a view to determining the limiting factors which control their successful culture and conducts the breeding and testing of new varieties. Several field stations are maintained. Field investigations are conducted on some of the Indian reservations of the Southwest for testing crop plants which seem likely to be suited for culture by the Indians and by white settlers in adjoining regions. Dates, Smyrna figs, hardy citrus fruits, pistaches, and certain drought-resistant tree crops are being tested.

*Scientific staff.*—T. Ralph Robinson, crop technologist; S. C. Mason, arboriculturist; G. P. Rixford, physiologist; E. M. Savage, assistant plant breeder; Bruce Drummond, assistant in arboriculture; Katherine H. Wead, scientific assistant; Esten W. Campbell and A. R. Leding, assistants in date investigations; William S. England and Edgar A. Palmer, agents; Eugene May, jr., plant propagator; Robert J. Bullen, assistant in citrus quarantine; Elizabeth H. Groff, Chinese interpreter and indexer and botanical assistant; Michael J. Hagerty, indexer and translator of Chinese; George W. Groff, field assistant in citrus breeding work; Rose E. Gamble, botanical artist.

**Soil Bacteriology Investigations.** Directed by Associate Chief of Bureau.

This work is a study of the relation of bacteria to soil fertility, plant growth, cellulose destruction, and the fixation of nitrogen. Pure cultures of nodule-forming bacteria for leguminous crops are distributed.

*Scientific staff.*—Felix Löhnis, soil biologist; F. M. Scales, assistant soil mycologist; Alfred P. Dachnowski, physiologist; F. L. Goll and Lewis T. Leonard, assistant physiologists; Nathan R. Smith, assistant bacteriologist; Franklin W. Marsh, scientific assistant; Arthur P. Harrison, statistical assistant; Samuel H. Newcomer, physical laboratory helper; Raymond B. Wailes, laboratory aid.

**Soil Fertility Investigations.** OSWALD SCHREINER, *Biochemist in charge.*

This office studies the causes of and remedy for infertility in certain soils, whether natural or arising from improper methods of cultivation and cropping. It separates, identifies, and studies certain organic substances found in unproductive soils, and corrects their evil effects by mechanical handling, by the use of fertilizers, and by other methods available to the farmer. It makes a study of the action of fertilizers on field crops.

*Scientific staff.*—Bailey E. Brown, Joshua J. Skinner, and Lewis A. Hurst, biochemists; Frank M. Schertz, soil biochemist; Fred R. Reid, Ralph B. Deemer, and Edward F. Snyder, assistant biochemists; Albert M. Jackson, laboratory aid.

**Crop Acclimatization and Adaptation Investigations.** O. F. COOK, *Bionomist in charge.*

These investigations have special reference to the acclimatization in the South and Southwest of Central American varieties of cotton, corn, and other tropical crop plants. The breeding of cottons for the boll-weevil territory is a special feature.

*Scientific staff.*—G. N. Collins, Conrad B. Doyle, and H. Pittier, botanists; W. B. Camp, J. H. Kempton, H. F. Loomis, C. G. Marshall, R. D. Martin, George W. R. Davidson, and Howard G. McKeever, assistants in crop acclimatization; D. W. Frear, agriculturist; Homer C. McNamara, farm superintendent; James F. Breazeale, associate bio-

chemist; C. J. King and Frank M. Eaton, assistants in plant nutrition; Robert L. Taylor and Harold M. Young, physical laboratory helpers; Barnie V. Hasselfield, laboratory and field assistant in crop acclimatization. Frank M. Allen, assistant in technology.

**Fiber-Plant Investigations.** L. H. DEWEY, *Botanist in charge.*

These investigations deal with the study of fiber plants likely to prove of value in the United States and the encouragement of fiber-plant industries.

*Scientific staff.*—H. T. Edwards, specialist in fiber-plant production; Robert L. Davis, scientific assistant; Rafael Vidal and A. H. Wright, agents; Lucille Goodloe, laboratory aid.

**Drug, Poisonous, and Oil Plant Investigations.** W. W. STOCKBERGER, *Physiologist in charge.*

These investigations, which include both field and technical laboratory studies, deal with the commercial culture and production of drug, oil-seed, volatile-oil, and related crops; possibilities in utilization of pits, culls, and similar waste materials of the canning and fruit-packing industries as sources of oils and other valuable products; improvement of active-principle content of drug plants; properties and geographic distribution of poisonous plants.

*Scientific staff.*—G. Archie Russell, expert in drug-plant investigations; Frank Rabak and Arthur F. Sievers, chemical biologists; Willard W. Eggleston, assistant botanist.

**Plant Physiological and Fermentation Investigations.** HOMER L. SHANTZ, *Physiologist in charge.*

This office studies the fundamental physiological requirements of plants; the physiology of germination; the nature of changes in constituents and in structure produced in plants by injury, disease, action of parasites, storage processes, etc.; the metabolism of molds and parasitic plant organisms; the function and significance of enzymes in plants; and factors underlying immunity to disease.

*Scientific staff.*—Otis F. Black, chemical biologist; Samuel L. Jodidi, organic chemist; Charles E. Sando, junior biological chemist; Heinrich Hasselbring, physiologist; James W. Kelly, chemical laboratorian.

**Cereal Investigations.** CARLETON R. BALL, *Cerealists in charge.*

This office deals with the culture, adaptation, improvement, genetics, and uses of cereal crops, including corn; the prevention of diseases affecting cereals; the cultivation of flax for seed purposes, including a study of flax diseases; and the production and improvement of broom corn.

*Scientific staff.*—Clyde W. Warburton, Clyde E. Leighty, Harry V. Harlan, Charles P. Hartley, Charles E. Chambliss, Curtis H. Kyle, Louis C. Aicher, Ernest B. Brown, and J. Allen Clark, agronomists; Merritt N. Pope, Jenkin W. Jones, Fred D. Richey, John B. Sieglinger, Thomas R. Stanton, John H. Martin, and John M. Jenkins, assistant agronomists; Harry B. Humphrey, George M. Reed, William H. Weston, jr., Aaron G. Johnson, James R. Holbert, Wendell H. Tisdale, George N. Hoffer, James G. Dickson, and Forrest E. Kempton, pathologists; Charles S. Reddy, Victor F. Tapke, Glenn M. Smith, John F. Trost, W. E. Brentzel, Helen Johann, Marion A. Griffiths, Harold H. McKinney, Benjamin Koehler, Moses N. Levine, Annie M. Hurd, Charles O. Johnston, Florence M. Smith, Florence S. Willey, Albert F. Thiel, John W. Baringer, Henry C. Gilbert, George C. Mayone, Noel F. Thompson, and Robert J. Hosmer, assistant pathologists; David E. Stephens, superintendent of cereal field station; John W. Taylor, Victor H. Florell, Benjamin H. Duddleston, Ralph W. Smith, Olaf S. Aamodt, John C. Brinsmade, jr., George J. Burt, Ludwig S. Mayer, Hugo Stoneberg, John G. Willier, Franklin A. Coffman, Merle T. Jenkins, Ralph W. May, Arthur F. Swanson, Ross R. Childs, Robert W. Leukel, Grace O. Wineland, Edith K. Seymour, Ruth F. Allen, and John H. Parker, scientific assistants; Fred N. Briggs and Horace M. Woolman, field assistants in plant pathology; Harry S. Garrison and Joseph M. Hammerly, assistants in corn investigations; William T. Craig, Lyman C. Burnett, Ralph H. Carr, Lewis J. Stadler, Hugo W. Albertz, Edwin G. Schafer, Frederick J. Stevenson, William W. Mackie, Edwin B. Mains, Elvin C. Stakman, Leo E. Melchers, Henry D. Barker, Charles R. Hursh, Herbert S. Jackson, Karl S. Quisenberry, William R. Sempill, Walter F. Reddy, Gilbert D. George, Rupert H. Porter, and Vesta C. Haney, agents.

**Tobacco and Plant Nutrition Investigations.** W. W. GARNER, *Physiologist in charge.*

The tobacco work has to do with the improvement of tobacco by hybridization and selection, the improvement of methods of growing and handling the crop, the combating of diseases, and the general study of the tobacco industry. Experiments and demonstrations in the growing of tobacco in rotation with farm crops are features of the work.



The plant-nutrition studies relate to some of the broad problems concerned in the growth and development of crop plants as affected by nutrition.

*Scientific staff.*—E. H. Mathewson and G. W. Harris, crop technologists; Otto Olson, D. E. Brown, W. M. Lunn, E. G. Moss, James P. Young, J. E. McMurtry, jr., and C. M. Slagg, assistants in tobacco investigations; H. A. Allard, physiologist; Charles W. Bacon, assistant physiologist; Robert A. Steinberg, junior biological chemist; James Johnson, Theodore C. McIlvaine, and Willard W. Green, agents; Albert B. Creed, field and laboratory aid.

**Agricultural Technology.** N. A. COBB, *Technologist in charge.*

These investigations deal with the improvement of technological methods in crop production and with the technology of the products and studies of free-living and plant-infesting nematodes.

*Scientific staff.*—Emil G. Arzberger, pathologist; M. L. Harrison, assistant in technology; C. B. Bateman, mechanical assistant in technology; Charlotte E. Sprengel and Nona L. Doherty, assistants in nematology.

**Seed-Testing Laboratories.** EDGAR BROWN, *Botanist in charge.*

These laboratories are charged with the enforcement of the seed importation act and also examine samples of commercial seeds for the presence of adulteration and conduct a general propaganda in the interest of pure seed for the farmer. The work is performed both in Washington, D. C., and at cooperative laboratories in the field.

*Scientific staff.*—F. H. Hillman and W. L. Goss, assistant botanists; Eben H. Toole, assistant pathologist; Emma F. Sirrine, Bertha C. Hite, Helen H. Henry, Etta O. Gilbert, Emma S. Doyle, Agnes J. Ryder, Salome E. Comstock, Alma L. Eggleston, Jane C. Kinsella, Kathleen Bland, and Pearl Drummond, scientific assistants.

**Forage-Crop Investigations.** CHARLES V. PIPER, *Agrostologist in charge.*

The forage-crop investigations include methods of production, development, and dissemination of new valuable varieties; extension of forage crops into sections where they are adapted but are grown only to a limited extent; and cooperation in the introduction and extension of new crops.

*Scientific staff.*—A. J. Pieters, Harry N. Vinall, Lyman Carrier, Roland McKee, William J. Morse, Harvey L. Westover, and Albert A. Hansen, agronomists; Morgan W. Evans and Alexander B. Cron, assistant agronomists; Percy L. Ricker, assistant botanist; Samuel Garver, Leonard W. Kephart, Hiram R. Reed, Robert E. Getty, Harry A. Schoth, and Norval F. Woodward, scientific assistants; Vernon E. Hafner, John B. Thompson, Charles E. Hill, and Oscar E. Barbee, agents; Anselm T. Stone and Charles W. Lee, field station aids; Ellen I. S. Wallis, artist; George W. Oliver, plant breeder.

**Alkali and Drought Resistant Plant Investigations.** T. H. KEARNEY, *Physiologist in charge.*

This office investigates the alkali resistance of crop plants; develops, by breeding and selection, strains of field crops which will be more resistant to drought than the varieties now obtainable; and studies the physiology of drought resistance. The work is conducted in close cooperation with other branches of the bureau concerned with the upbuilding of agriculture in the West and Southwest.

*Scientific staff.*—A. C. Dillman, physiologist; Wilfred W. Ballard, assistant in crop acclimatization; Walter F. Gilpin, assistant plant breeder.

**Economic and Systematic Botany.** FREDERICK V. COVILLE, *Botanist in charge.*

This office maintains economic collections of cultivated plants and makes systematic studies of grasses and other economic plants, compiles for publication information on native plants, tests wild and little-known plants, and experiments with a view to the improvement of the grazing areas on the public lands.

*Scientific staff.*—A. S. Hitchcock, systematic agrostologist; W. E. Safford, economic botanist; Sidney F. Blake and Ivar Tidestrom, assistant botanists; Agnes Chase, assistant agrostologist; Oliver M. Freeman and Katherine D. Kimball, herbarium assistants.

**Dry-Land Agriculture Investigations.** E. C. CHILCOTT, *Agriculturist in charge.*

This office studies proper cultural methods for the growing of crops in the semiarid regions of the West, especially in that portion known as the Great Plains area. The objects are to determine the best methods of soil preparation and crop rotation for the conservation of moisture and the maintenance of humus in the soil.

*Scientific staff.*—John S. Cole and John M. Stephens, agriculturists; Ellery F. Chilcott, George W. Morgan, Jesse E. Mundell, Floyd L. Kelso, Walter M. Osborn, Ray S. Towle, John J. Baylès, Joseph F. Brandon, Harry J. Clemmer, Albert Osenbrug, Urso J. Downey, Charles H. Ruzicka, Leroy Moomaw, and O. A. Thompson, farm superintendents; Alanson L. Hallstead, Oscar R. Mathews, Johnson T. Sarvis, Arthur E. Seamans, John C. Thysell, Lowell F. Locke, Fred E. Keating, Donald R. Burnham, and W. P. Baird, assistants in dry-land agriculture; Robert Wilson and Francis E. Cobb, assistants in dry-land arboriculture; Leslie L. Zook, physiologist; John W. McLane, laboratory assistant.

**Western Irrigation Agriculture.** C. S. SCOFIELD, *Agriculturist in charge.*

The work is concerned with the development of profitable agriculture on the lands to be placed under irrigation in the western United States, and also with the testing of various crops suited for growth under irrigation. The work is conducted in cooperation with a number of the investigational offices of the bureau.

*Scientific staff.*—F. B. Headley, assistant agriculturist; Beyer Aune, Daniel Hansen, James A. Holden, Edward G. Noble, and George T. Ratliffe, farm superintendents; C. E. Peterson, assistant in arboriculture.

**Sugar-Plant Investigations.** C. O. TOWNSEND, *Pathologist in charge.*

This office investigates all factors bearing upon the production and improvement of sugar plants, including a study of cultural methods, diseases, and the importation, selection, and breeding of varieties, as well as the proper handling and utilization of the raw material and of the by-products. It also studies the relation of the sugar crops, beet, cane, and sweet sorghum, to all other activities on the farm, including crop rotation, stock raising, labor, markets, etc., so far as these factors have any bearing upon the production and utilization of sugar plants and their by-products and upon the yield and quality of the finished products, sugar and sirup.

*Scientific staff.*—William H. Burns, Samuel B. Nuckols, and Joe G. Lill, agriculturists; Edward C. Rittue, assistant; Caroline T. Rumbold, Elmer W. Brandes, and Eubanks Carsner, pathologists; Peter J. Klapaak, assistant pathologist; William J. Uckele, assistant agriculturist; W. W. Tracy, jr., and Peter A. Yoder, technologists; H. B. Cowgill, agronomist and plant breeder; Ernest Reed and Dean A. Pack, plant breeders; Gerald Thorne, scientific assistant; S. F. Sherwood, assistant chemist; M. W. Hensel, Clement E. Craig, and Levi A. Giddings, agents.

**Horticultural and Pomological Investigations.** L. C. CORBETT, *Horticulturist in charge.*

These investigations have to do with the improvement of methods of producing, shipping, and storing perishable fruits, truck, and related crops; landscape and vegetable gardening; floriculture and related subjects. The work is divided into fruit production, fruit utilization, viticulture, nut culture, pomological breeding, fruit history, fruit nomenclature and identification, truck-crop production, vegetable breeding, landscape gardening, floriculture and miscellaneous horticultural investigations, potato investigations, fruit and vegetable transportation, and storage investigations in cooperation with the Bureau of Markets.

*Scientific staff.*—H. P. Gould, Charles P. Close, Edward R. Lake, Charles F. Kinman, and George C. F. Husmann, pomologists; Carl S. Pomeroy and George M. Darrow, assistant pomologists; William R. Beattie, William Stuart, David Griffiths, James H. Beattie, Charles T. Dearing, Fred E. Miller, D. N. Shoemaker, Furman L. Mulford, Joseph W. Wellington, W. C. Edmundson, and Charles F. Clark, horticulturists; Louis L. Corbett, Chester J. Hunn, and P. Maxwell Lombard, assistant horticulturists; Archibald D. Shamel, John R. Magness, R. Claude Wright, Walter Van Fleet, Joseph S. Caldwell, and Lon A. Hawkins, physiologists; Charles A. Magoon and Charles W. Culpepper, assistant physiologists; Clarence A. Reed and Milo N. Wood, nut culturists; William F. Wight, botanist; Will W. Tracy, sr., superintendent of testing gardens; Elmer Snyder, Ralph E. Caryl, Magdalene R. Newman, and Benjamin Y. Morrison, scientific assistants; F. L. Husmann, viticultural superintendent; Robert L. Newton, mechanical assistant in refrigeration; Royal C. Steadman, artist; George F. Taylor, chemical laboratorian; J. C. Milward, agent; Guy E. Yerkes, vineyard superintendent.

**Foreign Seed and Plant Introduction.** DAVID FAIRCHILD, *Agricultural Explorer in charge.*

This office secures promising new seeds and plants, both by agricultural exploration and by correspondence, and these are tested at the plant-introduction field stations or through cooperation with other offices, experiment stations, experimenters, and private individuals. Investigations in plant propagation and in the development of certain plant industries are features of the work.

*Scientific staff.*—P. H. Dorsett, plant introducer in charge of plant-introduction field stations; Beverly T. Galloway, plant pathologist in charge of plant protection and propagation; Peter Bisset, plant introducer in charge of foreign plant distributions; Wilson Popenoe and Joseph F. Rock, agricultural explorers; H. C. Skeels, botanist; G. P. Van Eseltine, assistant botanist; Robert A. Young, plant introducer; E. L. Crandall, L. G. Hoover, and Robert N. Jones, assistants in plant introduction; P. G. Russell and Henry E. Allanson, scientific assistants; Cecil C. Thomas, assistant in plant pathology; Edward Goucher, and Harry Klopfer, plant propagators; J. E. Morrow, farm superintendent in charge of plant-introduction field station, Chico, Calif.; Edward Simmonds, garden and field station superintendent in charge of plant-introduction field station, Miami, Fla.; David A. Bisset, assistant, in charge of plant-introduction field station, Brooksville, Fla.; Henry E. Juenemann, superintendent of plant-introduction field station and bulb garden, Bellingham, Wash.; Edwin J. Rankin, in charge of Savannah (Ga.) bamboo garden; Frank J. Hopkins, laboratory aid; Howard A. Houser, Bergie L. Peters, Charles H. Steffani, and David M. Wallen, field station aids.

#### **Congressional Seed Distribution.**

This work consists of the securing, packeting, and mailing of the quantities of vegetable, flower, and other seeds and plants necessary for congressional distribution, as well as the testing, propagation, and distribution of improved seeds of various crops.

*Staff.*—R. A. Oakley, agronomist in charge; Oliver F. Jones, executive assistant; J. E. W. Tracy, superintendent of seed distribution.

#### **Demonstrations on Reclamation Projects.** ABRAM C. COOLEY, *Agriculturist in charge.*

This office conducts demonstration work with individual farmers and farmers' organizations on the Government reclamation projects, for the purpose of assisting in the establishment of specific agricultural industries suited to the conditions on these projects.

*Scientific staff.*—L. E. Cline, Harry A. Ireland, George A. Wright, and H. K. Dean, agriculturists for reclamation projects; Wallace S. Murdock, dairy husbandman.

#### **Experimental Gardens and Grounds.** E. M. BYRNES, *Assistant in charge.*

This office is charged with the care and ornamentation of the department grounds, the maintenance of greenhouses and plant collections, and the propagation of plants for experimental and other purposes. Experimental work with florists' crops is also being conducted in the greenhouses.

#### **Arlington Experimental Farm.** Directed by L. C. CORBETT, *Horticulturist.*

The Arlington farm is the field laboratory at Washington for the Bureau of Plant Industry, as well as for other bureaus of the department. Widely varying field tests are conducted on the farm.

*Staff.*—E. C. Butterfield, horticulturist in general charge; J. H. Criswell, assistant superintendent.

### **BUREAU OF CHEMISTRY.**

*Chief,* CARL L. ALSBERG. *Assistant Chief,* W. G. CAMPBELL.

The Bureau of Chemistry is concerned primarily with questions of agricultural chemistry of public interest, the enforcement of the food and drugs act, analytical work, and investigations under the food and drugs act, and other chemical investigations referred to it by the various branches of the Government service.

*Detailed to chief.*—V. Birkner, S. F. Brewster, J. Davidson, D. B. Dill, F. B. La Forge, W. E. Mathewson, J. C. Munch, H. Runkel, C. R. Smith, and E. T. Wherry.

**General Administration.** P. B. DUNBAR, *Administrative Assistant*; F. B. LINTON, *Assistant to the Chief*; S. A. POSTLE, *Administrative Assistant*; M. BOYLE, C. W. CRAWFORD; LOUISE DUVAL, *Librarian*; KATHARINE A. SMITH, *Editor*.

#### **Office of Imports.** A. E. TAYLOR, *Chemist in charge.*

This office has general supervision over the activities of the bureau under the food and drugs act, relating to imported foods and drugs, with a view to coordinating the work done at the ports of entry.

#### **Office of Cooperation.** T. F. PAPPE, *Acting Chemist in charge.*

This office endeavors to promote close and cordial cooperation between municipal, State, and Federal officials charged with the enforcement of all food and drug laws, works out policies for such cooperation, and seeks to unify and harmonize the work and policies of such officials.



**Office of Development Work.** D. J. PRICE, *Engineer in charge.*

This office arranges for the development on a commercial or industrial basis of processes desired, and discoveries made, in the bureau, and assists in placing the scientists responsible for such processes in touch with appropriate commercial and industrial organizations. It investigates the causes of plant-dust explosions and fires in thrashers, mills, elevators, cotton gins, and storage warehouses, to determine the most effective means of preventing such explosions and fires. The work is done in cooperation with the Bureau of Public Roads, the Bureau of Markets, the Bureau of Plant Industry, Bureau of Mines in the Department of the Interior, and the Pennsylvania State College. It has charge of the experimental work being conducted by the bureau on the production of gas from waste agricultural products, for heat, light, and power on the farm.

This division makes investigations and cooperates with individuals, firms, or corporations owning or operating plants for drying or dehydration of vegetables, fruits, and other perishable edible products, in order to determine the best means and processes of dehydration, and to disseminate information as to the value and suitability of these products for food.

*Scientific staff.*—Development work and plant-dust explosion and fire investigations: H. R. Brown, J. O. Reed, and H. E. Roethe. Commercial dehydration investigations: Engineering, W. A. Noel, in charge; laboratory, C. E. Mangels, chemist in charge, C. R. Gross, P. F. Nichols, and Ray Powers, assistants.

**Drug Administration.** M. W. GLOVER, *Surgeon, Public Health Service, in charge.*

This office has to do with the preparation of cases dealing with violation of the provisions of the food and drugs act relating to drugs.

*Assistants.*—J. S. Jamison,<sup>1</sup> A. S. Mitchell, F. P. Morgan, and A. G. Murray.

**Analytical Reagents Investigation Laboratory.**—G. C. SPENCER, *Acting Chemist, in charge.*

This laboratory examines and standardizes chemicals, reagents, and apparatus; also studies the occurrence of heavy metals in natural and manufactured food products.

*Scientific staff.*—W. F. Clarke, assistant.

**Animal Physiological Chemical Laboratory.** F. C. WEBER, *Chemist in charge.*

The work in this laboratory includes a complete study of the application of chemical methods to the determination of deterioration of animal foods; investigations in the canning of marine products; salting, drying, and smoking of fish; and experimental work to improve the methods of analysis ordinarily employed in physiological chemistry.

*Scientific staff.*—J. B. Wilson, assistant.

**Carbohydrate Laboratory.** H. S. PAINE, *Chemist in charge.*

This laboratory analyzes sugars, sirups, molasses, honeys, jellies, jams, preserves, infant foods, confectionery, and similar substances in connection with the enforcement of the food and drugs act. Analyses are also made of samples of sugars, starches, sirups, and molasses bought by the General Supply Committee. The laboratory investigates the manufacturing processes used in the production of raw and refined sugar and molasses, maple sugar, sirups from cane, maple, and sorghum, and confectionery. Improved methods of chemical analysis are studied, and also the characteristic constants by which pure carbohydrates are distinguished.

*Scientific staff.*—O. S. Keener, F. W. Reynolds, and C. F. Walton, jr., assistants.

**Color Investigation Laboratory.** J. A. AMBLER, *Acting Chemist in Charge.*

The various projects on the study of color substances which have been in progress in this bureau for some time are concentrated in this laboratory, and the investigations have been extended with a view to the prosecution of research of value to the American industries.

*Scientific staff.*—E. Q. Adams, G. H. Mains, O. A. Nelson, S. Palkin, Max Phillips, C. E. Senseman, L. D. Smith, and H. Wales, jr., assistants.

**Drug Division.** L. F. KEELE, *Chief.*

This division studies the properties, composition, and quality of drugs and medicinal preparations, and analyzes samples of such products purchased on the market. It also studies methods which may lead to more satisfactory analytical processes, especially for testing potent plant drugs and products derived from them. Toxicological investi-

<sup>1</sup> Acting assistant surgeon, Public Health Service.

gations are made here. It cooperates with the Post Office Department in ridding the mails of fraudulent medical and other allied schemes.

*Scientific staff.*—W. O. Emery, W. F. Kunke, E. K. Nelson, and C. D. Wright, assistants.

**Food Control Laboratory.** I. K. PHELPS, *Chemist in charge.*

The food control laboratory supervises the chemical examination of food products (not including cattle feeds) under the food and drugs act. This work includes the critical examination of reports and methods, food analysis, and the investigation of questions arising under the food and drugs act as they relate to these products. Special studies are also made of the manufacture and production of food products, the analysis of dairy products, the analysis of flour, the bleaching of flour, the analysis of some fermented food products, and the identification of some of the products of fermentation in such food products.

*Scientific staff.*—L. H. Bailey, R. T. Balch, O. L. Evenson, L. W. Ferris, J. T. Keister, Lottie M. Manress, Marie L. Offutt, J. I. Palmore, O. I. Rains, O. S. Rask, M. Ruderman, and Dorothy B. Scott, assistants.

**Food Investigation Laboratory.** R. W. BALCOM, *Chemist in charge.*

This laboratory conducts investigations that are necessary as a basis for the regulatory work in food control. At the present moment the following problems are under investigation: The composition of commercial generator vinegar and the changes taking place in the conversion of cider into vinegar; some essential oils and synthetic flavors and flavoring extracts prepared therefrom; gelatin.

*Scientific staff.*—H. A. Lepper, assistant.

**Fruit and Vegetable Utilization Laboratory.** H. C. GORE, *Chemist in charge.*

This laboratory is investigating the utilization of surplus and cull fruits and vegetables. At present the drying of vegetables and fruits and the utilization of potatoes and sweet potatoes are receiving the most attention. Much of this work is in cooperation with the Bureau of Plant Industry. This laboratory has cooperated also with the Quartermaster Corps and with the Sanitary Corps in the drying of vegetables.

**Leather and Paper Laboratory.** F. P. VEITCH, *Chemist in charge.*

This laboratory conducts investigations of tannins and tanning materials, their effects upon the strength and properties of leather, and processes involved in their production; problems relating to the production of leather; the qualities of papers and their fitness for use in the Department of Agriculture and other departments of the Government which may request such investigations; the nature and uses of turpentine and resins, together with improved processes of production; the grading, weighing, and handling of naval stores, and preparation of definite type samples therefor; and the water and mildew proofing of fabrics and of leather. Turpentine and rosin are examined under the food and drugs act. Leathers, turpentine, resins, and textiles are examined for the departments of the Government requesting such work, and specifications are prepared for the purchase of these articles.

*Scientific staff.*—I. D. Clarke, R. W. Frey, V. E. Grotlich, H. P. Holman, M. G. Hunt, T. D. Jarrell, B. S. Levine, E. O. Reed, W. F. Sterling, and G. C. Swan, assistants.

**Microbiological Laboratory.** CHARLES THOM, *Mycologist in charge.*

This laboratory consists of a research section and a regulatory section and works upon the relation of molds and bacteria to food products. Its research projects cover studies of yeasts, oysters, sauerkraut, canned goods, deterioration of cereal products and of forage, classification and activities of bacteria and molds, and the development and standardization of methods applicable to biological inspection work. Its regulatory staff conducts the bacteriological inspection of milk, oysters, gelatin, table waters, tomato products, canned foods and miscellaneous inspection samples in which spoilage is suspected.

*Scientific staff.*—M. B. Church, Ruth B. Edmondson, A. C. Hunter, S. A. Koser, E. Lefevre, and W. P. North, jr., assistants.

**Microchemical Laboratory.** B. J. HOWARD, *Microscopist in charge.*

This laboratory makes microscopical and microchemical studies of foods, drugs, cattle feed, paper and textile materials, miscellaneous agricultural products, etc. It also makes microscopical examinations of insecticides, and studies methods for their microscopical identification and estimation. Special attention is given to the histological study of fruits, spices, cereals, starches, and other agricultural products for the purpose of perfecting methods for detecting the adulteration of these products.

*Scientific staff.*—G. L. Kennan, V. A. Pease, E. A. Read, B. H. Silberberg, and C. H. Stephenson, assistants.



**Miscellaneous Division.** J. K. HAYWOOD, *Chief*.

This division comprises the insecticide and fungicide laboratory, a cattle food and grain investigation laboratory, and a trade wastes laboratory, and studies insecticides and fungicides, cattle foods, forage crops, grains, trade wastes, and certain hygienic problems, making analyses under the food and drugs act and the insecticide act, and performing such miscellaneous chemical work as may be referred to it. This division makes cooperative investigations of insecticides and fungicides for the Bureau of Entomology and Bureau of Plant Industry, and is engaged, with the latter bureau, in a number of cooperative studies of grain and forage crops. Much time is given to the investigation of new methods of analysis of insecticidal and fungicidal materials and to chemical investigations of insecticides and fungicides.

*Scientific staff.*—Cattle food and grain investigation laboratory: G. L. Bidwell, chemist in charge; L. E. Bopst, M. R. Coe, J. B. Reed, and G. P. Walton, assistants. Insecticide and fungicide laboratory: C. C. McDonnell, chief; J. D. Bowling, jr., W. A. Gersdorff, M. H. Goodman, C. E. Goodrich, F. L. Hart, R. Jenkins, R. F. Russ, A. S. Schultz, H. D. Young, F. C. Cook, J. J. T. Graham, E. L. Griffin, W. D. Lynch, L. N. Markovitz, W. J. Morgan, A. C. Nothstine, L. P. Shippen, C. M. Smith, and C. B. Stone, assistants. Trade wastes laboratory: Under J. K. Haywood, chief.

**Nitrogen Laboratory.**

Nitrogen determinations for all laboratories of this bureau, as well as for many of the other bureaus of the department, are made in the nitrogen laboratory. Work in cooperation with the Association of Official Agricultural Chemists is also done, looking to the improvement of the methods for making these determinations.

*Assistants.*—L. J. Jenkins, J. F. Ellis, and E. D. Stirlen.

**Oil, Fat, and Wax Laboratory.** G. S. JAMIESON, *Chemist in charge*.

This laboratory analyzes oils, fats, cooking compounds, chocolates, nut butters, and similar substances in connection with the enforcement of the food and drugs act. It studies the chemical composition of American food oils, fats, and hydrogenated compounds, and carries on investigations in the production of such products.

*Scientific staff.*—W. F. Baughman and D. H. Brauns, assistants.

**Pharmacognosy Laboratory.** A. VIEHOEVER, *Pharmacognosist in charge*.

This laboratory supervises the inspection of crude drugs under the food and drugs act. It investigates the chemical, histological, and morphological characteristics of drugs and plants. It works on the improving of methods of drug analysis and on the establishing of standards for drugs and other plant products.

*Scientific staff.*—R. C. Capen and J. F. Clevenger, assistants.

**Pharmacological Laboratory.** E. W. SCHWARTZ, *Acting Pharmacologist in charge*.

This laboratory makes researches on the physiological action of poisonous substances occurring in food products and of drugs used in medicine, and physiological tests of drugs to ascertain the strength and purity of medicinal preparations found in the open market.

**Phytochemical Laboratory.** F. B. POWER, *Chemist in charge*.

The purpose of this laboratory is to subject plants and vegetable drugs to a complete chemical investigation, with special consideration of such constituents as may represent their physiological activity. It thus endeavors to ascertain the possible utilization of various plants or their active principles as therapeutic agents, and also to facilitate the detection of drugs in such medicinal preparations or other products as are subject to surveillance under the food and drugs act.

*Scientific staff.*—V. K. Chesnut, assistant.

**Protein Investigations Laboratory.** D. B. JONES, *Acting Chemist in charge*.

This laboratory investigates and analyzes the proteins which occur in seeds and other vegetable substances used as foods. At present the proteins of the peanut, the velvet bean, coconut, buckwheat, and kafir are under investigation. The purpose of these researches is to ascertain the nutritive value of the various proteins. Feeding experiments are conducted in cooperation with the Bureau of Animal Industry. Experimental work is also done to improve the methods used in the preparation and analysis of proteins.

*Scientific staff.*—A. J. Finks, C. E. F. Gersdorff, and H. C. Waterman, assistants.

**Tea Inspection.** G. F. MITCHELL, *in charge*.

This office examines importations of tea at various ports of entry, admitting only those shipments that meet the required standard.

*Scientific staff.*—H. F. Brown, L. G. Fenton, E. C. Griswold, C. F. Hutchinson, A. B. Ingalls, W. F. Skene, C. Toohey, and G. A. Weiant, assistants.

**Water and Beverage Laboratory.** W. W. SKINNER, *Chemist in charge.*

This laboratory studies the composition of waters, brines, salts, and nonalcoholic beverages, and analyzes samples of such products taken in the enforcement of the food and drugs act. It investigates sanitary and technical problems relating to the production of bottled waters, nonalcoholic beverages, and related products.

*Scientific staff.*—C. H. Badger, Anna E. Mix, J. W. Sale, and W. A. Schaefer, assistants.

**Field Investigation Service.****Citrus By-Products Laboratory.** E. M. CHACE, *Chemist in charge.*

This laboratory directs its attention to devising methods for the utilization of cull oranges and lemons. With this in view, methods are being studied for the manufacture of citric acid, oils of lemon and of orange, concentrated orange juice, and orange vinegar. It conducts investigations relating to the maturity of fruits and vegetables.

*Scientific staff.*—C. G. Church, F. E. Denny, and H. D. Poore, assistants.

**Food Research Laboratory.** H. A. MCALEER, *in charge.*

The food research laboratory makes chemical, bacteriological, and histological studies of foods preserved by low temperatures. Milk, poultry, eggs, and fish have been the objects of investigation, with reference to their decomposition and putridity during preparation, transportation, storage, and marketing in connection with the food and drugs act. A special investigation of frozen and dried eggs and egg products has been carried on, chiefly in the egg-breaking establishments and with the cooperation of the industry; a similar investigation of fish, both fresh and frozen, is now being conducted.

*Scientific staff.*—L. H. Almy, E. B. Benson, J. M. Borders, Elmer Field, J. S. Hepburn, H. R. Hill, R. C. Holden, D. C. Kennard, H. J. Macomber, and P. S. White, assistants.

**Field Regulatory Service.****Food and Drug Inspection.**

The country has been divided into three food and drug inspection districts, eastern, central, and western, each with a chief in charge, who has immediate supervision of the branch stations and the inspectors within his district. The eastern inspection district (W. R. M. Wharton,<sup>1</sup> New York) includes the stations in Baltimore (D. M. Walsh<sup>2</sup>), Boston (G. H. Adams<sup>2</sup>), Buffalo (H. H. Wagner<sup>2</sup>), New York (H. W. Redfield<sup>2</sup>), Philadelphia (A. Stengel<sup>2</sup>), San Juan (W. J. McGee<sup>2</sup>), Savannah (J. O. Clarke<sup>2</sup>). The central inspection district (R. E. Doolittle,<sup>1</sup> Chicago) includes the stations in Chicago (G. W. Hoover<sup>2</sup>), Cincinnati (L. B. Forst<sup>2</sup>), Minneapolis (W. H. Callahan<sup>3</sup>), New Orleans (R. S. Hollingshead<sup>2</sup>), and St. Louis (E. R. Smith<sup>2</sup>). The western inspection district (R. W. Hiltz,<sup>1</sup> San Francisco) includes the stations in Denver (G. J. Morton<sup>2</sup>), San Francisco (W. Vincent<sup>2</sup>), and Seattle (A. W. Hansen<sup>2</sup>). There is a corps of 51 food and drug inspectors in the field. This force is in charge of the field operations connected with the enforcement of the food and drugs act. Its duties include the collection and analyses of official samples of foods and drugs, the inspection of establishments manufacturing products subject to the act, and such other investigations as are necessary in connection with its enforcement. The preliminary steps in the development of prosecutions under the food and drugs act are taken by the field stations. The field laboratories also supervise importations of foods and drugs at the various ports. In addition to the regulatory work, the laboratories are called upon to examine many samples submitted by other branches of the Government service.

**State Officials Collaborating in the Enforcement of the Food and Drugs Act.**

*Alabama.*—M. C. Allgood, Commissioner of Agriculture and Industries, Montgomery. *Arizona.*—Jane H. Rider, Director of State Laboratory, University of Arizona, Tucson. *Arkansas.*—C. W. Garrison, State Health Officer, Little Rock; J. G. Ferguson, Commissioner of Mines, Manufactures, and Agriculture, Little Rock. *California.*—E. J. Lea, Director, Bureau of Foods and Drugs, State Board of Health, University of California, Berkeley. *Colorado.*—W. F. Cannon, Food and Drug Commissioner, State Department of Health, Capitol Building, Denver. *Connecticut.*—Thomas Holt, Dairy and Food Commissioner, Capitol Building, Hartford. *Delaware.*—L. S. Conwell, Secretary, State Board of Health, Dover. *District of Columbia.*—W. C. Fowler, Health Department, Washington; R. R. Ashworth, Chief Food Inspector, Washington; George M. Roberts, Department of Weights, Measures, and Markets, Washington. *Florida.*—W. A. McRae,

<sup>1</sup> Chief of district.<sup>2</sup> Chief of station.<sup>3</sup> Acting chief of station.

Commissioner of Agriculture, Tallahassee. *Georgia*.—J. J. Brown, Commissioner of Agriculture, Atlanta. *Hawaii*.—M. B. Barios, Deputy Food Commissioner, Honolulu. *Idaho*.—P. L. Neil, Dairy, Food, and Sanitary Inspector, Boise. *Illinois*.—J. L. McLaughlin, Superintendent of Foods and Dairies, Department of Agriculture, 1410 Kimball Building, Chicago. *Indiana*.—I. L. Miller, State Board of Health, Statehouse, Indianapolis. *Iowa*.—W. B. Barney, Dairy and Food Commission, Des Moines. *Kansas*.—S. J. Crumbine, State Board of Health, Topeka; L. A. Fitz, State Agricultural College, Manhattan. *Kentucky*.—Sarah H. Vance, Agricultural Experiment Station, University of Kentucky, Lexington; J. D. Turner, Agricultural Experiment Station, Lexington. *Louisiana*.—Oscar Dowling, State Board of Health, New Orleans; Harry D. Wilson, Department of Agriculture and Immigration, Baton Rouge. *Maine*.—E. E. Philbrook, Acting Commissioner of Agriculture, Augusta. *Maryland*.—A. L. Sullivan, State Department of Health, Baltimore. *Massachusetts*.—E. R. Kelley, Commissioner of Health, Boston; Philip H. Smith, Agricultural Experiment Station, Amherst. *Michigan*.—F. L. Woodworth, Dairy and Food Commissioner, Lansing; A. J. Patten, Agricultural Experiment Station, East Lansing. *Minnesota*.—Chris. Heen, Dairy and Food Commissioner, New Capitol, St. Paul. *Mississippi*.—W. F. Hand, Agricultural and Mechanical College, Agricultural College. *Missouri*.—E. L. Barnhouse, Food and Drug Commissioner, Merchants Bank Building, Jefferson City. *Montana*.—W. F. Cogswell, State Board of Health, Helena. *Nebraska*.—Leo Stuhr, Secretary of Department of Agriculture, Lincoln. *Nevada*.—S. C. Dinsmore, Food and Drug Commissioner, Reno. *New Hampshire*.—Charles Duncan, State Board of Health, Concord. *New Jersey*.—R. B. Fitz-Randolph, Department of Health, Trenton; J. G. Lipman, Director of Agricultural Experiment Station, New Brunswick. *New York*.—Charles S. Wilson, Division of Agriculture, Department of Farms and Markets, Albany; E. H. Porter, Commissioner of Foods and Markets, Albany. *North Carolina*.—W. A. Graham, Commissioner of Agriculture, Raleigh. *North Dakota*.— — — — —, Food Commissioner, Agricultural College. *Ohio*.—Thomas C. Gault, Board of Agriculture, Dairy and Food Division, Columbus. *Oklahoma*.— — — — —, Department of Public Health, Guthrie; J. A. Whitehurst, Board of Agriculture, Oklahoma City. *Oregon*.—C. L. Hawley, Dairy and Food Commission, 510 Worcester Building, Portland. *Pennsylvania*.—James Foust, Department of Agriculture, Harrisburg. *Porto Rico*.—A. R. Soler, Commissioner of Health, San Juan. *Rhode Island*.—Raymond C. Colwell, Room 21, Statehouse, Providence. *South Carolina*.—B. Harris, Commissioner of Agriculture, Commerce, and Industries, Columbia. *South Dakota*.—Guy G. Frary, Department of Food and Drugs, Vermillion. *Tennessee*.—H. M. Robertson, Department of Food and Drugs, Nashville; F. M. McRee, Commissioner of Agriculture, Nashville. *Texas*.—R. H. Hoffman, jr., Food and Drug Department, Austin; B. Youngblood, Agricultural Experiment Station, College Station. *Utah*.—W. M. Boyden, Dairy and Food Commissioner, Salt Lake City. *Vermont*.—Charles F. Dalton, State Board of Health, 184 Church Street, Burlington. *Virginia*.—A. B. Thornhill, Department of Agriculture and Immigration, Richmond. *Washington*.—E. F. Benson, Commissioner of Agriculture, Olympia. *West Virginia*.—S. L. Jepson, Commissioner of Health, Charleston. *Wisconsin*.—C. P. Norgord, Commissioner, Department of Agriculture, Madison; G. J. Weigle, Dairy and Food Commissioner, Madison. *Wyoming*.—C. Stanley Greenbaum, Deputy Dairy, Food, and Oil Commissioner, Cheyenne.

#### BUREAU OF SOILS.

*Soil Physicist and Chief of Bureau*, MILTON WHITNEY; *Assistant to the Chief*, A. G. RICE; CHAS. H. SEATON, *Editor*.

The Bureau of Soils investigates the relation of soils to climate and organic life; studies the texture and composition of soils in field and laboratory; and maps and classifies the soils in selected areas in the different parts of the country.

The bureau prepares annually the report of the Field Operations of the Bureau of Soils, which contains a detailed description of the soils and of the agricultural conditions of the various areas surveyed, points out the present use of the soils, and discusses possible changes in crops and methods of cultivation. Large-scale lithographic maps showing the distribution of the different kinds of soils accompany each report.

The bureau investigates domestic fertilizer resources, and carries on work looking to improvement in the methods of fertilizer manufacture, and to the discovery of new materials or new combinations of materials for use in fertilizers.

**Soil Chemical Investigations.** CHARLES J. MOORE, *Scientist in charge*.

Chemical laboratories are maintained for the investigation of the composition of soil types, the nature and occurrence of soil minerals, the composition of the soil solution, and the properties of soils in their relation to origin, texture, and productiveness.



Routine chemical work in connection with the Soil Survey and other divisions of the bureau and other offices and bureaus of the department is also carried on.

*Scientific staff.*—J. G. Smith, M. S. Anderson, W. O. Robinson, R. S. Holmes, H. E. Middleton, and G. J. Hough.

**Soil Physical Investigations.** R. O. E. DAVIS, *Scientist in charge.*

In the physical laboratories investigations of the properties of the soil are carried on and a study made of their economic bearing; the moisture relations, aeration, heat conductivity, texture, and other physical properties are investigated in their relation to soil productivity; mineralogical and mechanical analyses are made of soil types for the Soil Survey parties; and apparatus for field parties and for other divisions of the bureau is constructed and tested.

*Scientific staff.*—J. B. Kershaw, J. B. Spencer, L. B. Olmstead, and A. A. Riley.

**Investigations of Fertilizer Resources.** C. C. FLETCHER, *acting in charge.*

Investigations are made into the fertilizer resources of the United States with a view to discovering new sources of fertilizer materials and to utilizing for fertilizer many waste products; improvement in existing methods of manufacture and the study of new methods are carried out.

*Scientific staff.*—H. Bryan, W. C. Crandall, C. J. Crawley, W. H. Ross, C. C. Fletcher, A. R. Merz, T. B. Turley, J. W. Turrentine, W. H. Waggaman, R. F. Gardiner, William Hazen, and R. Jones.

**Soil Survey Investigations.** CURTIS F. MAREUT, *Scientist in charge*; GEORGE W. BAUMANN, *Executive Assistant.*

The work of the Soil Survey includes the study of the field characteristics of soils, the formulation of definitions and descriptions for individual soil types on the basis of their field characteristics, the identification of the various soil types thus defined, and the determination of their distribution, area, relationships, and agriculture in the United States. The work is carried on mainly by the detailed study of small unit areas such as counties and experiment-station farms, in many cases in cooperation with various State organizations.

*Scientific staff.*—Inspectors: Southern division, W. E. Hearn and H. H. Bennett; Northern division, T. D. Rice; Western division, M. H. Lapham. Soil specialist: J. E. Lapham. Soil surveyors: A. C. Anderson, Mark Baldwin, Miles W. Beck, E. J. Carpenter, W. T. Carter, jr., C. E. Deardorff, E. B. Deeter, R. E. Devereaux, E. D. Fowler, W. J. Geib, Alvin W. Goke, Frank A. Hayes, G. B. Jones, R. C. Jurney, John A. Kerr, N. M. Kirk, E. W. Knobel, A. E. Kocher, W. J. Latimer, H. G. Lewis, Clarence Lounsbury, C. B. Manifold, A. M. O'Neal, jr., S. O. Perkins, S. W. Phillips, H. C. Smith, J. M. Snyder, Edmund H. Stevens, A. T. Strahorn, A. T. Sweet, A. E. Taylor, W. E. Tharp, J. O. Veatch, W. I. Watkins, E. B. Watson, and L. A. Wolfanger.

## BUREAU OF ENTOMOLOGY.

*Entomologist and Chief of Bureau*, L. O. HOWARD; *Entomologist and Assistant Chief of Bureau*, C. L. MARLATT; *Assistant to Chief*, E. B. O'LEARY; *Chief Clerk and Executive Assistant*, A. J. LEISTER; *Editor*, ROLLA P. CURRIE; *Librarian*, MABEL COLCORD.

The Bureau of Entomology studies insects with special reference to methods of control, experiments with the introduction of beneficial insects, makes tests with insecticides and insecticide machinery, and identifies insects sent in by inquirers. Field laboratories are located throughout the country.

**Southern Field Crop Insect Investigations.** W. D. HUNTER, *Entomologist in charge*; J. L. WEBB, *Entomologist, acting in charge.*

These investigations deal with insect pests of cotton, tobacco, sugar cane, peanut, and rice, and are planned to reveal practical methods of control. Special attention is given to the Mexican cotton-boll weevil and its parasitic enemies. An investigation of the Argentine ant is included.

*Scientific staff.*—A. C. Morgan, B. R. Coad, and T. E. Holloway, entomologists; T. C. Barber, S. E. Crumb, J. D. Mitchell, and G. D. Smith, entomological assistants; E. R. Barber, F. S. Chamberlin, R. W. Moreland, Joseph N. Tenhet, and J. U. Gilmore, scientific assistants; E. S. Tucker, G. L. Garrison, F. F. Bondy, T. P. Cassidy, W. B. Williams, and M. T. Young, cotton entomologists; Joe Milam, special field agent; S. T. Howard, mechanical engineer; Robert L. Saul, field superintendent in insect control.

**Cereal and Forage Insect Investigations.** W. R. WALTON, *Entomologist in charge.*

The clover and alfalfa seed chalcis-fly, wireworms, grasshoppers, the corn leaf-aphis and the corn root-aphis, the alfalfa weevil, the fall army worm, the Hessian fly, the corn



earworm, the southern corn rootworm, false wireworms, the alfalfa caterpillar, the chinch bug, white grubs, the western army cutworm, jointworms, the European corn borer, the sorghum midge, and the clover and alfalfa root curculio are among the objects of these investigations. Fifteen field stations in cooperation with the farmer are distributed over the United States. Thus insects involved in the injury of all cereal and forage crops are investigated from an economic point of view throughout the entire area of distribution. In this way it is practicable to investigate any insect as affected by every variation of condition under which the farmer is obliged to contend with it in his own fields. Investigations are carried out as far as possible in the fields of the farmer, who is thus enabled to see what is being done.

*Scientific staff.*—G. I. Reeves, W. J. Phillips, C. N. Ainslie, A. B. Gahan, V. L. Wildermuth, G. G. Ainslie, Philip Luginbill, H. P. Wood, and R. A. Vickery, entomological assistants; A. F. Satterthwait, L. P. Rockwood, T. R. Chamberlin, C. M. Packard, C. F. Turner, C. C. Hill, P. R. Myers, Samuel Blum, W. B. Cartwright, C. K. Fisher, W. A. Baker, Kenneth M. King, W. H. Larrimer, Max M. Reeher, B. G. Thompson, E. V. Walter, W. O. Ellis, B. E. Hodgson, H. L. Parker, R. J. Kewley, J. S. Wade, W. B. Turner, J. R. Horton, M. C. Lane, H. R. Painter, F. W. Poos, R. H. Van Zwaluwenburg, K. W. Babcock, G. W. Barber, J. H. Harman, and F. L. O'Rourke, scientific assistants; D. J. Caffrey, assistant in charge, corn-borer investigations; D. W. Jones, entomologist in insect parasitology; Carl Heinrich, specialist in forest Lepidoptera; C. H. Gable, specialist in alfalfa insects; W. R. Thompson, specialist; L. H. Worthley, expert in charge, corn-borer control; C. W. Lewis, C. E. Towle, and Saul Phillips, field superintendents in insect control; R. A. Blanchard, K. M. Pack, G. B. Pearson, H. H. Walkden, G. P. Babson, H. N. Bartley, E. G. Brewer, T. M. Cannon, W. B. Clark, J. W. Enwright, F. L. Fail, C. O. Larrabee, T. R. Richardson, L. B. Sander-son, F. S. Vidler, D. H. Craig, F. W. Grigg, and E. M. Searles, field assistants in insect control.

**Deciduous-Fruit Insect Investigations.** A. L. QUAINANCE, *Entomologist in charge.*

Insects injurious to orchards, vineyards, and nut trees are studied in this work. Field laboratories are maintained in important fruit-growing regions, as in California, Washington State, Oregon, Georgia, Mississippi, Texas, and New Jersey. Experiments in the use of insecticides and spraying apparatus are made. The important projects include: Investigations of apple insects, as the codling moth, apple borers, apple aphids, etc.; investigations of peach insects, as the peach borer, plum curculio, etc.; investigations of grape insects, as the grape-berry moth and miscellaneous grape insects; Japanese beetle control operations; investigations of nut insects, as those affecting the pecan and chestnut. Other projects are: Investigations of orchard insecticides and spraying machinery; control of deciduous fruit insects by natural agencies, and deciduous fruit nursery insect investigations.

*Scientific staff.*—C. P. Clausen and J. L. King, specialists; A. C. Baker, F. E. Brooks, E. H. Siegler, W. S. Abbott,<sup>2</sup> and C. H. Hadley, entomologists; C. W. Stockwell and W. F. Runyen, plant quarantine inspectors; J. F. Jamieson, assistant entomological inspector; A. T. Speare, mycoentomologist; N. E. McIndoo and C. H. Richardson, insect physiologists; M. A. Yothers, specialist in apple insect investigations; J. B. Gill, G. A. Runner, and J. J. Culver,<sup>2</sup> entomological assistants; E. J. Newcomer, A. J. Ackerman, Dwight Isely, B. R. Leach, W. M. Davidson,<sup>2</sup> O. I. Snapp, A. J. Flebut, W. D. Whitcomb, B. A. Porter, E. R. Selkregg, P. W. Mason, C. H. Alden, A. I. Fabis, F. J. Brinley, and E. R. Van Leeuwen, scientific assistants; A. R. Whitcraft, Clifford Bintliff, J. J. Wilkins, R. W. Coles, D. W. Davis, and Charles Lemon, field assistants in insect control.

**Tropical and Subtropical Fruit Insect Investigations.** A. L. QUAINANCE, *Entomologist in charge.*

Insects affecting all tropical and subtropical fruits are subjects of research, including those affecting the various species of citrus, olive, fig, etc., and greenhouse pests. The principal methods of control are investigated, namely, fumigation with hydrocyanic-acid gas, trapping, and spraying with contact and poison insecticides. The important projects include: Citrus-fruit insect investigations in California, citrus-fruit insect investigations in Florida, investigations of the Argentine ant in relation to citrus fruits, investigations of insects affecting tropical and subtropical plants in greenhouses, and investigations of miscellaneous subtropical insects.

*Scientific staff.*—W. W. Yothers, entomologist; C. A. Weigel, A. D. Borden, and A. C. Mason, assistant entomologists; Florence Bowman, Emily S. Morrison, and C. F. Doucette, scientific assistants; E. R. Sasseer, H. L. Sanford, N. Perrine, and H. K. Plank, collaborators.

<sup>2</sup> Employed in "Enforcement of insecticide act."

**Investigations of the Mediterranean and Other Fruit Flies.** C. L. MARLATT, *Entomologist and Assistant Chief of Bureau, in charge.*

Investigation and control, in cooperation with the Federal Horticultural Board, of the Mediterranean and other fruit flies. Determination of the geographical distribution and importance of fruit-fly enemies of cultivated fruits as a basis for adequate quarantine or regulatory action, including studies of life history, means of artificial control, and control through the introduction and distribution of natural enemies. The important projects include: Control of export Hawaiian fruit, control of foreign fruit offered for entry, investigations of foreign fruit offered for entry, and geographical-distribution and life-history studies of fruit flies.

*Scientific staff.*—H. F. Willard, fruit-fly quarantine inspector; Harold Morrison, entomological explorer; W. M. Mann, specialist in ants; G. F. Moznette, assistant entomologist; T. L. Bissell, plant quarantine inspector.

**Truck-Crop Insect Investigations.** F. H. CHITTENDEN, *Entomologist in charge.*

Determination, by the usual field experimental and research methods, of the cause, extent, and character of insect injury to vegetable and truck crops, and of the most effective measures of prevention and control. The insects investigated include those affecting the potato, sweet potato, cabbage and other cole crops, beans, peas, and other leguminous food crops, tomato, onion, and melon, cucumber, and other cucurbits. Special attention is given to the Colorado potato beetle, potato tuber moth, potato aphid, potato leafhopper, potato flea-beetles, onion thrips, bean ladybird, bean aphid and pea aphid, cabbage worms and loopers, cabbage flea-beetles, root-maggots, cabbage and spinach plant-lice, cucumber beetles, squash bugs, tarnished plant-bug, cutworms, wireworms, grasshoppers, mole-crickets, tomato fruitworm, blister beetles, strawberry weevil, strawberry leaf-rollers, raspberry cane-borers; insects injurious to greenhouse vegetables and certain miscellaneous crops; determination of the life history of sugar-beet infesting insects, including leafhoppers, the root-aphid, sugar-beet webworms, wireworms, false chinch bug, beet leaf-beetles, white grubs, and other pests; and studies of the agency of insects in the transmission of cucumber and melon wilt and mosaic, potato blight, curly-top of sugar beets, anthracnose of beans, and similar diseases. This office is also charged with the direction of the campaign for the control and eradication of the sweet-potato weevil in the Gulf States.

*Scientific staff.*—C. H. Popenoe, entomologist; J. E. Graf, entomologist in charge of field work, eradication of sweet-potato weevil; M. M. High and D. E. Fink, entomological assistants; C. F. Stahl, R. E. Campbell, B. L. Boyden, J. E. Dudley, jr., C. E. Smith, L. G. Gentner, W. H. White, Mrs. D. H. Blake, and K. L. Cockerham, scientific assistants; N. F. Howard, specialist in insects as carriers of plant diseases; S. H. Rountree and W. E. Stone, agents; W. H. Merrill, J. W. Hendry, S. C. Brummitt, W. W. Mingee, L. M. Pritchard, and F. A. Wright, field assistants in sweet-potato weevil eradication.

**Stored-Product Insect Investigations.** E. A. BACK, *Entomologist in charge.*

Studies of both common and newly introduced insects injuriously affecting stored wheat, corn, oats, and other grains and flour, meal, and other mill products, including all cereal foodstuffs in flour mills, elevators, and warehouses, involving special investigation of railway and steamboat lines as carriers of infestation; study of the insect enemies of dried fruits and nuts, beans, peas, and cowpeas, and cured meats, hides, furs, and manufactured fabrics; and investigation and demonstration of appropriate measures for the control of such insects, including tests of promising and standard fumigants and other insecticides against these species, and of kiln-drying and heat methods against grain pests, especially grain weevils, and of those attacking edible legumes.

*Scientific staff.*—J. A. Hyslop, entomologist; R. T. Cotton, A. O. Larson, and Perez Simmons, scientific assistants; J. C. Bridwell, specialist in Bruchidae and their parasites; S. E. McClendon, field assistant in insect control.

**Forest Insect Investigations.** A. D. HOPKINS, *Forest Entomologist in charge.*

Investigations are conducted in the field and laboratory of the scientific and economic problems in connection with insects affecting forest, shade, and ornamental trees and hardy shrubs and forest products, with an ultimate view to the development and perfection of practical methods of control and prevention. These investigations include studies of beneficial as well as destructive insects as they affect such trees and shrubs in life and in all subsequent stages of use. Permanent field stations are distributed in the principal forested areas of the country, to serve as headquarters and centers of their respective districts, for the investigation of local insect problems. Demonstrations of practical control methods are undertaken through correspondence with, or direct supervision of, private individuals or officers in charge of forests, wood lots, parks, or city shade trees and ornamental shrubs.

*Scientific staff.*—J. M. Miller (in charge of Pacific Slope station at Northfork, Calif.), assistant forest entomologist; J. C. Evenden (in charge of substation at Coeur d'Alene, Idaho), specialist in forest entomology; J. E. Patterson (in charge of substation at Ashland, Oreg.), entomological ranger; H. E. Burke (in charge of forest-insect laboratory at Los Gatos, Calif.), specialist in forest entomology; W. E. Glendinning (in charge of substation at Chico, Calif.), entomological ranger; W. D. Edmonston (in charge of Southern Rocky Mountain station at Colorado Springs, Colo., and temporary substation, Tucson, Ariz.), specialist in forest entomology; T. E. Snyder and S. A. Rohwer, specialists in forest entomology; William Middleton, J. H. Pollock, and R. A. St. George, scientific assistants; R. D. Hartman, assistant entomological inspector; George Hofer, entomological ranger.

**Investigations of Insects Affecting the Health of Man and Animals.** *Under immediate direction of the Chief of Bureau.* W. D. HUNTER and J. L. WEBB, *Entomologists.*

This field covers the relation between certain ticks and spotted fever, mosquitoes and malaria and yellow fever, and the house fly and typhoid fever. The investigations also deal with insects as internal and external parasites of animals and seek practical methods for their control. A number of pests affecting domestic animals, including the cattle tick, the stable fly, and the horn fly, are being studied.

*Scientific staff.*—F. C. Bishopp, D. L. Van Dine, and W. V. King, entomologists; D. C. Parman, entomological assistant; E. W. Laake, R. W. Wells, and George H. Bradley, scientific assistants; O. G. Babcock, special field agent.

**Investigations in Bee Culture.** E. F. PHILLIPS, *Apiculturist in charge.*

The structure, development, and behavior of the bee are subjects of investigation. Special attention is given to methods of wintering bees, both in cellars and outdoors, with chief emphasis at present on the effect on colony strength in spring and on the brood rearing previous to the honey flow. Bee diseases are being thoroughly studied. A study is also being made of the methods of beekeeping best adapted to honey production in the different typical beekeeping regions of the United States. Better beekeeping and the production of larger crops of honey are stimulated through the efforts of field workers in cooperation with several of the more important beekeeping States and by means of extension short courses for beekeepers.

*Scientific staff.*—G. S. Demuth and L. R. Watson, apicultural assistants; A. P. Sturtevant, specialist in the bacteriology of bee diseases; G. H. Cale, apiculturist in extension work; H. L. McMurphy, E. S. Prevost, C. L. Sams, George H. Rea, R. B. Willson, and Newman I. Lyle, agents.

**Gipsy Moth and Brown-Tail Moth Investigations.** A. F. BURGESS, *Entomologist in charge.*

A large field force is maintained in New England in the work of preventing the spread of these two moths by scouting and clean-up work in the field. A laboratory has been established for the assemblage, study, and liberation of imported parasites and diseases affecting these moths. The work of the parasites and their natural enemies is studied in the field and many experiments are conducted for the purpose of devising better methods for use in field operations. A quarantine is maintained, and all products likely to carry these insects are inspected before they are shipped from the infested area.

*Scientific staff.*—H. L. McIntyre, gipsy moth assistant, preventing spread of moths; D. M. Rogers, assistant, in charge of gipsy moth quarantine and inspection; C. W. Collins, S. S. Crossman, F. H. Mosher, and R. Wooldridge, entomological assistants; S. M. Dohanian, C. E. Hood, J. V. Schaffner, jr., J. N. Summers, and R. T. Webber, scientific assistants; M. T. Smulyan, specialist; H. L. Blaisdell, P. S. Coffin, W. A. Collins, F. W. Foster, L. E. Gibson, H. R. Gooch, F. W. Graham, L. T. Guild, J. E. R. Holbrook, D. D. Landers, H. J. Miles, C. W. Minott, D. G. Murphy, W. A. Shinkwin, H. W. Vinton, A. W. Young, and M. I. Winchester, gipsy moth assistants; M. T. Sheerin, entomological laboratory assistant; I. L. Bailey, plant quarantine inspector; C. T. Davis and C. A. McIsaac, assistant entomological inspectors; H. A. Ames, H. N. Bean, and F. W. Graves, jr., general foremen; W. J. Ahearn, W. W. Bancroft, C. M. Emerson, M. H. Feeney, T. W. Feeney, M. D. Fox, D. J. Frazier, G. J. Galvin, D. Harrington, J. Keefe, F. L. Keene, R. W. Kennedy, J. F. Keough, C. A. Manchester, S. E. May, J. F. McDevitt, P. H. Meagher, J. A. Millar, G. A. Miller, J. F. Murray, W. J. Nestle, I. B. Newbegin, L. H. Noble, J. A. Priest, J. J. Roach, W. Sarsfield, and A. C. Ward, field assistants in insect control.

**Miscellaneous Investigations.** *Under immediate direction of the Chief of Bureau.*

The naming, classification, and establishment of the systematic relationships of all insects which are being studied in the various laboratories of the bureau and the



identification of similar material submitted by the agricultural experiment stations and by scientific workers are included under this head.

*Scientific staff.*—Rolla P. Currie, entomologist; R. A. Cushman and C. S. Menagh, entomological assistants; William Schaus, specialist in Lepidoptera; H. E. Ewing, specialist in mites; C. T. Greene, specialist in Diptera; L. H. Weld, specialist in Hymenoptera; E. A. Schwarz, A. N. Caudell, and H. S. Barber, assistants.

**Editorial Office.** ROLLA P. CURRIE, *Editor*; LUCILE H. QUARRY, *Assistant*.

The editorial office attends to the editing of manuscripts, the reading of proofs of publications and other printed matter, correspondence relating to manuscripts, proofs, and publications, and other work of a similar nature.

### BUREAU OF BIOLOGICAL SURVEY.

*Biologist and Chief of Bureau*, E. W. NELSON; *Assistant Chief*, W. C. HENDERSON; *Assistant to Chief*, A. B. MORRISON; *Assistant in Operations*, E. J. THOMPSON; *Chief Clerk*, H. M. HOYT; *Editor*, W. H. CHEESMAN.

The Bureau of Biological Survey has charge of the work of the department relating to the control and conservation of wild birds and mammals and investigations of their relation to agriculture. It studies their food habits and investigates methods of protecting beneficial species and controlling harmful ones; experiments in fur farming; controls injurious mammals in national forests and other public domain; makes biological surveys of areas, studies the geographic distribution and habits of wild animals and plants, and maps natural life zones; supervises national big-game and bird reservations; administers Federal laws for the protection of birds and game, and of fur-bearing animals in Alaska, and laws regulating interstate commerce in game and the importations of wild birds and mammals; and makes investigations for the improvement of the reindeer herds in Alaska.

### Economic Investigations.

A. K. FISHER, *Assistant in charge*; W. B. BELL, *Assistant Biologist*.

**Life Habits (including Food Habits) of Injurious Animals.** A. K. FISHER and E. A. GOLDMAN, *Assistant Biologists*.

Under this project studies are made in conjunction with the Division of Biological Investigations of the life and food habits of rodents and predatory animals injurious to agriculture, horticulture, forestry, animal husbandry, and wild game, and of their geographic distribution, with a view to their control or eradication.

*Scientific staff.*—Vernon Bailey.

**Eradication Methods.** A. K. FISHER, W. B. BELL, and S. E. PIPER, *Assistant Biologists*; LISLE MORRISON, *Assistant*.

Investigations are made leading to the determination of practical methods for the control and eradication of rodents and predatory animals.

*Field staff.*—H. E. Williams.

**Destruction of Injurious Rodents.** W. B. BELL and S. E. PIPER, *Assistant Biologists*; LISLE MORRISON, *Assistant*.

Under this project extensive campaigns are carried on in national forests and other public domain to destroy prairie dogs, ground squirrels, pocket gophers, rabbits, and other rodents destructive to forest, orchard, and nursery stock, farm produce, and the range. Demonstrations are also made in farming districts of improved methods of combating these animals.

*Field staff.*—C. F. Bliss, L. K. Couch, W. E. Crouch, A. M. Day, P. L. De Puy, I. N. Gabrielson, F. E. Garlough, D. A. Gilchrist, A. E. Gray, D. D. Green, E. E. Horn, Joseph Keyes, R. Luckenbill, B. J. Melton, A. W. Moore, A. E. Oman, B. B. Richards, E. R. Sans, T. H. Scheffer, H. R. Wells, and R. S. Zimmerman.

**Destruction of Predatory Animals.** W. B. BELL and S. E. PIPER, *Assistant Biologists*; LISLE MORRISON, *Assistant*.

Active campaigns are undertaken for the extermination of wolves, coyotes, mountain lions, and other animals destructive of live stock and poultry.

*Field inspectors.*—G. R. Bach, R. E. Bateman, C. J. Bayer, L. B. Crawford, L. J. Goldman, F. J. Hale, G. E. Holman, S. G. Jewett, L. Knowles, C. R. Landon, J. S. Ligon, M. E. Musgrave, C. G. Poole, E. F. Pope, A. L. Rasmussen, F. V. D. Reed, E. R. Sans, R. K. Stewart, B. B. Turner, E. Williams, and S. P. Young.



**Fur-Farming Investigations.** W. B. BELL, *Assistant Biologist*.

Investigations in fur farming are concerned with determining productive and economical methods of rearing foxes, minks, martens, and other fur animals in captivity, and ascertaining the areas suited to this industry.

*Scientific staff.*—K. B. Hanson (Keeseville, N. Y.), F. G. Ashbrook.

**Economic Ornithology.** W. L. MCATEE, *Assistant Biologist*.

Investigations are made of the food habits of birds for the purpose of determining the relation of birds to agriculture, horticulture, and forestry. By laboratory analyses of stomach contents and by field observations birds are classed as beneficial, neutral, or harmful in their relation to man, and recommendations are made for the protection of useful species and the repression of injurious ones. The food habits of waterfowl and upland game birds are investigated with a view to securing information of use in increasing the food supply in depleted areas. Methods of attracting desirable species about homes are studied and recommended.

*Scientific staff.*—L. L. Buchanan, E. R. Kalmbach, Remington Kellogg, W. F. Kubiček, F. P. Metcalf, Charles C. Sperry, and H. L. Viereck.

**Biological Investigations.**

E. A. GOLDMAN, *Assistant in charge*.

Under this division investigations are conducted in the field to determine the geographic distribution and habits of native wild life, and technical studies are made of groups and species to ascertain relationships and correct classification. The information gathered serves as a foundation for the efficient handling of most of the problems of the Survey. The published results appear in the form of reports on special groups of birds and mammals; also, on the birds and mammals of States and special areas, with maps and charts showing the distribution of species and the life-zone areas.

**Biological Surveys and Distribution of Mammals.** E. A. GOLDMAN and E. A. PREBLE, *Assistant Biologists*.

This section conducts investigations to determine the distribution and habits of native animals and plants. Maps are made showing areas occupied by each species of mammal and the summer and winter ranges and migration routes of birds, and from the combined data the natural distribution areas and life zones of the country are outlined. North American mammals are studied in order to determine the distribution, habits, and value of the different species and to secure data concerning areas to be restocked with big game; also to locate suitable areas for fur farming. Specimens of mammals are identified for Government bureaus, scientific and educational institutions, and private individuals.

*Scientific staff.*—Vernon Bailey, G. G. Cantwell, A. H. Howell, H. H. T. Jackson, H. C. Oberholser, and W. P. Taylor.

**Distribution and Migration of Birds.** H. C. OBERHOLSER, *Assistant Biologist*.

This section investigates the distribution, migration, and other habits of North American birds, through reports from several hundred volunteer observers, through the work of field parties, and through bird banding to follow the route of individuals of a species. The data obtained serve as a basis for protective legislation, both State and National. A national count of birds, made each spring by several hundred observers throughout the United States, is also of value in connection with the conservation and increase of useful species. Enumerations of migratory waterfowl, combined with an investigation of conditions in their breeding grounds and winter resorts, furnish information which will greatly assist in the conservation of these birds. Specimens of birds are identified for Government bureaus and for educational institutions, museums, and private individuals.

*Scientific staff.*—G. G. Cantwell, Francis Harper, A. H. Howell, H. H. T. Jackson, F. C. Lincoln, E. A. Preble, W. P. Taylor, and Alexander Wetmore.

**Life Habits (including Food Habits) of Injurious Animals.** E. A. GOLDMAN and A. K. FISHER, *Assistant Biologists*.

Under this section, in conjunction with the Division of Economic Investigations, studies are made of the life habits, including food habits, of rodents and predatory animals injurious to agriculture, horticulture, animal husbandry, and wild game and of their geographic distribution with a view to their control or eradication.

*Scientific staff.*—W. P. Taylor and A. H. Howell.

**Big-Game and Bird Reservations.**H. F. STONE, *Assistant in charge.*

This division has supervision over the 75 Federal big-game and bird reservations: the 5 big-game reservations are the Montana National Bison Range; the Winter Elk Refuge, in Jackson Hole, Wyoming; the Wind Cave National Game Preserve, South Dakota; the Sullys Hill National Game Preserve, North Dakota; and the Niobrara Reservation, Nebraska. It restocks national reservations by capturing, purchasing, and transporting big game, and protects birds on the big-game reservations.

*Reservation inspector.*—F. M. Dille (Valentine, Nebr.).

**Enforcement of the Migratory-Bird Treaty and Lacey Acts.**GEO. A. LAWYER, *Chief United States Game Warden, in charge.*

This division administers the Federal migratory-bird treaty act and publishes and enforces regulations made thereunder for the protection of migratory game, nongame, and insectivorous birds; issues permits to collect and possess migratory birds for scientific and banding purposes and migratory waterfowl for propagation; enforces the Lacey Act regulating interstate commerce in wild birds and animals and issues permits thereunder for their importation from foreign countries.

**Protecting Migratory Birds and Regulating Interstate Commerce in Game.**

GEO. A. LAWYER, *Chief U. S. Game Warden*; TALBOTT DENMEAD, *Deputy Chief*; W. ROY DILLON, *Assistant*; and FRANK L. EARNSHAW, *Assistant, Interstate Commerce in Game.*

The migratory-bird treaty and the Lacey acts are enforced by 29 United States game wardens, each assigned to a particular district, who are rendered valuable aid by the game authorities of most of the States, and in addition by approximately 300 United States deputy game wardens who render cooperative service and receive only nominal salaries. Information concerning game is prepared for publication; card indexes of State game laws and laws relating to fur-bearing animals as well as various indexes of information concerning these subjects are maintained; a summary of State and Federal game laws, laws relating to fur-bearing animals, a game-law poster, and a directory of game-protection officials are issued annually. That portion of the Lacey Act regulating interstate shipments of birds and plumage is now covered in the migratory-bird treaty act. Violations of the Lacey Act regulating interstate shipments of wild animals or parts thereof are investigated by the field force of this division, the necessary evidence is collected, and the first steps taken in preparing each case for legal action.

*United States game wardens.*—Bertrand E. Smith (Portland, Me.), Albert Stadlmeier (East Providence, R. I.), P. S. Farnham (Owego, N. Y.), P. K. Hilliard (Atlantic City, N. J.), Thomas T. Bloxson (Locustville, Va.), William L. Birsch (Norfolk, Va.), B. J. Pacetti (Ponce Park, Fla.), E. B. Whitehead (Tallahassee, Fla.), William H. Hoffman (Mobile, Ala.), John E. Perry (Memphis, Tenn.), S. W. Linebaugh (Russellville, Ky.), Marquis A. Charlton (Columbus, Ohio), B. G. Merrill (Hinsdale, Ill.), Conrad F. Asmuth (Milwaukee, Wis.), B. J. Shaver (St. Paul, Minn.), J. V. Kelsey (Watertown, S. Dak.), Charles P. S. Smith (Davenport, Iowa), John Q. Holmes (Orleans, Nebr.), Harry Barmer (St. Louis, Mo.), E. V. Visart (Little Rock, Ark.), George C. Shupee (San Antonio, Tex.), B. R. Britton (Secor, N. Mex.), E. P. Walker (Phoenix, Ariz.), Charles F. Heuser (Sacramento, Calif.), George E. Mushbach (Billings, Mont.), George Tonkin (Boise, Idaho), R. C. Steele (Seattle, Wash.), W. H. Ransom (Spokane, Wash.), Alfred M. Bailey (Juneau, Alaska).

**Investigations of Migratory Birds.** E. A. GOLDMAN and W. L. MCATEE, *Assistant Biologists.*

Under this project investigations are made under direction of the divisions of Economic Investigations and Biological Investigations of conditions in the breeding grounds and winter resorts of migratory birds for the purpose of securing information to use as a basis in determining proper regulations under the migratory-bird treaty act.

**Importation of Foreign Birds and Mammals.** T. S. PALMER, *Expert in Game Conservation.*

This office issues permits for importation, and regulates the entry, of foreign wild birds and mammals.

*Importation inspectors.*—New York, B. S. Bowdish, W. DeW. Miller; Philadelphia, W. L. Bailly; Baltimore, W. H. Fisher; San Francisco, H. C. Bryant, Joseph Grinnell, T. I. Storer; Honolulu, W. A. Bryan.

**Reindeer and land fur-bearing animals in Alaska.**

E. W. NELSON, *Chief of Bureau, in Charge*; W. F. BANCROFT, *Assistant in Game Conservation*.

This division has supervision over the reindeer industry in Alaska for the purpose of making investigations, experiments, and demonstrations for the welfare, improvement, and increase of these animals; and also has charge of the enforcement of the law and regulations for the protection of land fur-bearing animals in Alaska.

*Scientific staff.*—Seymour Hadwen, chief veterinarian (Unalakleet); Lawrence J. Palmer, assistant in charge, reindeer grazing investigations (Unalakleet); George F. Root, veterinarian (Unalakleet); Herbert W. Johnston, field assistant (Unalakleet); Olaus J. Murle, assistant biologist (Fairbanks).

*Fur wardens.*—Alfred M. Bailey, chief fur warden (Juneau); Ray C. Steele (Seattle, Wash.); Donald W. Stevenson (Unalaska).

**DIVISION OF PUBLICATIONS.**

*Chief of Division*, JOHN L. COBBS, Jr.; *Chief Clerk*, H. J. DEMAREE.

This division conducts the publication, press service, motion-picture, agricultural exhibit, and related informational work of the department; supervises the expenditure of the appropriation for general printing and binding for the department; conducts all business of the department transacted with the Government Printing Office; has general supervision of all editing, printing, indexing, illustrating, binding, and distribution of publications, and the maintenance of the mailing lists.

**Press Service.** DIXON MERRITT, *Assistant in charge*.

The Press Service is established to secure circulation in popular form of the discoveries and recommendations of the scientists, specialists, and field workers of the department. It gives out to the public press agricultural facts taken from publications and official orders, and also from oral statements of specialists. Material so disseminated is set forth in such form as to attract public attention, be easily understandable, and lead to the adoption of the methods recommended. A Weekly News Letter is published. The office also prepares circulars, posters, and pamphlets designed to assist workers in carrying out educational and demonstration plans.

**Motion Pictures.** FRED W. PERKINS, *Assistant in charge*; GEORGE R. GEORGENS, *Chief Cinematographer*.

This office conducts the motion-picture work of the department; prepares scenarios from material secured from the various bureaus; makes and directs the making of motion pictures; supervises the motion-picture laboratory in film production; develops and executes plans for film distribution; and handles the dissemination of information concerning agriculture, forestry, home economics, and other subjects covered by the activities of the department through the medium of motion pictures.

**Exhibits.** J. W. HISCOX, *Assistant in charge*.

The office of Exhibits supervises the preparation, shipment, and display of agricultural exhibits at fairs and expositions throughout the country and handles all correspondence of the department relative to exhibits at fairs and expositions of various kinds, cooperating with the several branches of the department in this work.

**Editorial, Printing, and Indexing.** L. C. EVERARD, *Chief Editor*; B. D. STALLINGS, *Assistant Chief*; CHARLES H. GREATHOUSE, *Assistant in charge of indexing*.

The work of this section includes the consideration and critical examination of all manuscripts submitted for publication by the various branches of the department. In making constructive criticisms and suggestions for the improvement of manuscripts, the chief editor is authorized to consult fully and freely with the chiefs of the bureaus, divisions, and offices, the authors of manuscripts, and any other officer or employee of the department.

This section also receives and transmits to the printer all matter to be printed for the department. It keeps the records showing the receipt and forwarding of manuscripts and printing of every description; keeps the accounts in connection with the printing appropriation of the department; receives, distributes, and examines all proof; prepares all correspondence relating to printing and illustrations; and inspects completed work.

Indexes are made to be printed with individual publications, and a general card index is maintained, by subjects, of the contents of all publications of the department.



**Illustrations.** J. H. STEVENSON, *Assistant in charge.*

Illustrations, cover designs, maps, graphs, charts, photographs, motion-picture legends, etc., are made or prepared for reproduction, to illustrate the various publications and to accompany the motion pictures of the department, and material of a specialized nature is prepared for educational exhibit purposes.

Photographs, lantern slides, bromides, and transparencies are prepared for use by the department and for sale to the public for educational purposes.

Electrotypes of illustrations appearing in department publications are supplied to outside concerns at commercial rates through regular commercial channels.

**Distribution of Publications.** FRANCIS J. P. CLEARY, *Assistant in charge.*

This office receives and directs the distribution of publications designed for department use; maintains the records of the department mailing lists, draws orders upon the Superintendent of Documents, Government Printing Office, for the mailing of department publications; specifies and orders the publications to be sent in response to miscellaneous and congressional requests; executes schemes of distribution for department publications; and keeps all records of the distribution of publications, including the congressional quotas of Farmers' Bulletins.

**Addressing, Duplicating, and Mailing.** C. E. BRACEY, *Assistant in charge.*

This section maintains and operates the mechanical addressing system in use in the department; performs duplicating work for various branches of the department, including the mimeographing of press notices; and mails publications for official use, press notices, official circulars, etc.

**DIVISION OF ACCOUNTS AND DISBURSEMENTS.**

*Chief of Division and Disbursing Clerk, A. ZAPPONE; Administrative Assistant, W. J. NEVIUS; Deputy Disbursing Clerk, A. T. TERWISSE.*

This division has charge of the disbursement of public funds appropriated for the Department of Agriculture and the keeping of accounts and appropriate ledgers in connection therewith.

**Cash Section.** G. T. ASH, *Cashier and Chief Clerk.*

This section prepares and mails all checks and handles all moneys received and disbursed.

**Bookkeeping Section.** H. B. PEFFERS, *in charge.*

This section keeps the books pertaining to the fiscal affairs of the department, prepares requisitions on the Treasury for advance of public funds, and compiles quarterly abstracts of expenditures and collections and an account current covering the liability for public funds.

**Examining Section.** J. M. KEMPER, Jr., *in charge.*

This section examines all accounts before payment.

**Miscellaneous Section.** W. R. FUCHS, *in charge.*

This section prepares miscellaneous fiscal statements and reports, handles the vouchers in connection with the Weeks forestry law, and performs miscellaneous work not assigned to other sections.

**BUREAU OF CROP ESTIMATES.**

*Statistician and Chief of Bureau, NAT C. MURRAY; Acting Chief of Division of Crop Reports, FRED J. BLAIR; Chief of Division of Crop Records, FRANK ANDREWS; Chief of Field Service, SAMUEL A. JONES; Chief Clerk, ARTHUR F. KRUEGER; Statistical Scientist, GEORGE K. HOLMES.*

The Bureau of Crop Estimates collects crop data, issues the monthly crop reports of the department, prepares the statistical portion of the Department Yearbook, and conducts special inquiries relative to United States and foreign crops and live stock for inclusion in bulletins and correspondence.

**Crop Reporting Board.**

A Crop Reporting Board, consisting of the chief of bureau (chairman) and four other members selected from the officials and agents of the bureau, considers in secret session all available data and issues periodic reports relative to acreage in planting season, con-



dition and indicated yield during the growing season, and production and yield at harvest time of the speculative crops (i. e., corn, wheat, oats, and cotton). The chief of bureau and his assistants consider data and issue corresponding reports for nonspeculative crops and live stock.

#### **Division of Crop Reports.**

*Field service.*—The service outside of Washington consists of 40 agricultural statisticians, clerks, and various independent lists of voluntary reporters, numbering in all approximately 220,000. The agricultural statisticians keep in touch with the best informed opinion throughout their districts by travel and by maintenance of special corps of reporters, and render periodic reports for their respective territories. Of the voluntary correspondents the county reporters submit reports regularly for their respective counties and the township reporters for their respective localities. Summaries of reports from these three independent sources form the bases of the reports issued by the bureau. Special lists of reporters are maintained for special inquiries.

*Clerical force.*—The clerical force of the Division of Crop Reports maintains various independent lists of voluntary crop reporters to whom regular and special blank schedules of inquiry are submitted for data desired. The information so secured is tabulated and arranged in convenient form for study and analysis by the Statistician and Crop Reporting Board.

#### **Division of Crop Records.**

The Division of Crop Records collects and makes available for study and use data relative to the agricultural products of the United States and foreign countries, prepares tables and special articles for the Department Yearbook and bulletins, provides statistical information in response to special inquiries, and conducts inquiries relative to various statistical phases of agriculture. A well-equipped library of agricultural statistics is maintained.

#### **LIBRARY.**

*Librarian, CLARIBEL R. BARNETT; Assistant Librarian, EMMA B. HAWKS.*

The department library, consisting of the main library and the various bureau, division, and office libraries, contains approximately 155,000 books and pamphlets, including an extensive collection on agriculture and all its branches, a large and representative collection on the sciences related to agriculture, and a good collection of standard reference books. In addition to the department use, books are lent to college and experiment station libraries and other institutions for use in connection with the researches of these institutions. Periodicals currently received number more than 2,700. A dictionary card catalogue is maintained consisting of about 450,000 cards. Printed catalogue cards for publications of the department are prepared by the department library and printed at the Library of Congress. The librarian has charge of the foreign mailing lists for department publications.

#### **STATES RELATIONS SERVICE.**

*Director, A. C. TRUE.*

The States Relations Service represents the Secretary of Agriculture in his relations with the State agricultural colleges and experiment stations under the acts of Congress granting funds to these institutions for agricultural experiment stations and cooperative extension work in agriculture and home economics, and in carrying out the provisions of acts of Congress making appropriations to this department for farmers' cooperative demonstration work, investigations relating to agricultural schools, farmers' institutes, and home economics, and the maintenance of agricultural experiment stations in Alaska, Hawaii, Porto Rico, Guam, and the Virgin Islands.

#### **Office of the Director.**

*EUGENE MERRITT, Assistant to the Director; Mrs. C. E. JOHNSTON, Administrative Assistant; Miss M. E. RYDER, Chief Clerk; F. E. SINGLETON, Chief Accountant; Miss M. L. GERICKE, Librarian.*

#### **Editorial Division. W. H. BEAL, Chief.**

This division edits and prepares for printing all publications of the States Relations Service except Experiment Station Record; cooperates with the Division of Publications in maintaining mailing lists and in the distribution of publications of the service;

and has charge of lantern slides and other illustrative material for service use, and the duplicating work of the service.

*Staff.*—Reuben Brigham, specialist in visual instruction in agriculture, in charge of section of illustrative material; C. H. Hanson, specialist in visual instruction in agriculture.

**Investigations on Agricultural Instruction in Schools.** E. H. SHINN, *Specialist in Agricultural Instruction.*

These investigations include studies of the methods and subject matter of school instruction in agriculture in this and other countries, with a view to determining the needs of such instruction in order to make it practically useful to students who are to become farmers or workers in agricultural institutions, and to furnish schools with up-to-date and properly organized subject matter and illustrative materials in the various branches of agriculture, to supplement and reinforce textbooks and field practices.

*Staff.*—C. H. Schopmeyer and F. A. Merrill, specialists in agricultural instruction; Marie T. Spethmann, assistant in agricultural instruction.

**Investigations on Farmers' Institutes.** J. M. STEDMAN, *Farmers' Institute Specialist.*

These investigations include studies on farmers' institutes and similar organizations carried on in this and other countries, especially with a view to providing farmers' institute and extension workers with publications and illustrative material especially adapted to their needs.

#### Office of Experiment Stations.

E. W. ALLEN, *Chief, and Editor of Experiment Station Record.*

#### Relations with Institutions for Agricultural Research.

Under this head the office is broadly organized to exercise the supervision provided by law over the funds and operations of the State agricultural experiment stations under Federal appropriations, and to afford such advice and assistance as will best promote their efficiency. It also collects and disseminates information regarding similar institutions throughout the world. Among its activities in relation to the stations are the following:

#### Examination of Work and Expenditures of the State Experiment Stations.

The office supervises the Federal funds granted to the State agricultural experiment stations under the acts of Congress of March 2, 1887, and March 16, 1906, with respect to the use made of these funds and the kind of work for which they are employed. This duty is assigned especially to the chief, with the assistance of E. R. Flint, J. I. Schulte, Walter H. Evans, and W. H. Beal.

#### Experiment Station Record.

The office publishes Experiment Station Record, a periodical which reviews in abstract the publications of the experiment stations, the Department of Agriculture, and other institutions and agencies reporting investigations in agricultural science in the different countries of the world. The Record also contains editorials and notes bearing upon station work. The staff of the Record is as follows: Editor, E. W. Allen; associate editor, H. L. Knight; agricultural chemistry and agrotechny, Sybil L. Smith; meteorology, soils, and fertilizers, W. H. Beal and R. W. Trullinger; agricultural botany, bacteriology, and plant pathology, W. H. Evans and W. E. Boyd; field crops, H. M. Steece; horticulture and forestry, E. J. Glasson; foods and human nutrition, C. F. Langworthy and Sybil L. Smith; animal production and dairying, F. J. Kelley; economic zoology and entomology, W. A. Hooker; veterinary medicine, W. A. Hooker and Sybil L. Smith; rural engineering, R. W. Trullinger; rural economics and sociology, Eugene Merritt and Louise Marbut; agricultural education, E. H. Shinn and Marie T. Spethmann; indexes, Martha C. Gundlach.

#### Division of Insular Experiment Stations. WALTER H. EVANS, *Chief.*

The experiment stations in Alaska, Hawaii, Porto Rico, Guam, and the Virgin Islands of the United States of America are conducted under the general direction of this division.

#### Alaska Agricultural Experiment Stations. C. C. GEORGESON, Sitka, *Agronomist in charge.*

The main station in Alaska is at Sitka. Investigations are also carried on at Rampart, in the Yukon Valley; at Kodiak; at Fairbanks, in the valley of the Tanana River;

and at Matanuska, near the Government railroad. The work consists of field experiments with vegetables, cereals, and forage plants; horticultural investigations; the maintenance of live stock; the curing of hay and silage; the distribution of seeds; and an agricultural survey of the Territory.

*Staff.*—G. W. Gasser, assistant in charge, Rampart; M. D. Snodgrass, assistant in charge, Fairbanks; C. S. Hahn, assistant, Fairbanks; W. T. White, assistant in charge, Kodiak; H. O. White, assistant, Kodiak; F. E. Rader, assistant in charge, Matanuska; B. L. Schneider, assistant, Matanuska; J. T. Bregger, assistant, Sitka.

**Hawaii Agricultural Experiment Station.** J. M. WESTGATE, Honolulu, *Agronomist in charge.*

The activities of this station are concerned with cotton, rice, forage crops, fiber, and horticultural plants; with soils, plant diseases, insects, and extension and demonstration work. In cooperation with the Hawaiian Government, a demonstration farm is maintained on the island of Hawaii.

*Staff.*—W. T. Pope, horticulturist; J. C. Ripperton, assistant chemist; H. L. Chung, agronomist; R. A. Goff, in charge of Glenwood substation and extension agent for island of Hawaii; F. G. Krauss, superintendent of extension division, Haiku, Maui.

**Porto Rico Agricultural Experiment Station.** D. W. MAY, Mayaguez, *Agronomist in charge.*

Investigations of this station relate especially to the growing of coffee, field crops, and horticultural plants, the development of animal husbandry and dairying, soils, vegetable pathology, and entomology. Cooperative and demonstration work is also in progress.

*Staff.*—L. G. Willis, chemist; J. O. Carrero, assistant chemist; T. B. McClelland, horticulturist; J. A. Saldana, assistant in horticulture; T. Bregger, plant breeder; W. P. Snyder, assistant in plant breeding; W. V. Tower, entomologist; H. C. Henriksen, specialist in farm management.

**Guam Agricultural Experiment Station.** C. W. EDWARDS, *Animal Husbandman in charge.*

The station in Guam is located near Agaña, the principal town. Experiments are being conducted in improved methods of cultivation, introduction, and improvement of tropical agricultural crops, and introduction of improved live stock.

*Staff.*—G. Briggs, agronomist and horticulturist; Joaquin Guerrero, assistant in horticulture; W. J. Green, assistant in extension work; P. Nelson, assistant.

**Virgin Islands Experiment Station.** LONGFIELD SMITH, St. Croix, *Agronomist in charge.*

The station is located on St. Croix, the largest island of the group. The experimental work in progress includes plant breeding with cotton and sugar cane, cultural experiments with tropical crops, rotations, green-manure crops, plant diseases and insect pests, soil and chemical studies, and various other activities.

*Staff.*—Longfield Smith, agronomist in charge; C. E. Wilson, entomologist.

#### Office of Extension Work in the South.

J. A. EVANS, *Chief*; W. B. MERCIER, *Assistant Chief.*

#### Relations with Extension Divisions of Agricultural Colleges in 15 Southern States.

Under this head the office cooperates with the extension divisions of the State agricultural colleges within its territory in their extension work in agriculture and home economics, under the act of Congress of May 8, 1914. It also acts as an agency for coordinating the extension work of the several bureaus of the department with similar work carried on by the agricultural colleges.

#### Farmers' Cooperative Demonstration Work.

Under this head extension and demonstration work on all subjects relating to agriculture, home economics, and rural life generally is carried on through practical demonstrations and instruction under the supervision and management of State, district, and county agents working with individuals and through organizations of farm men and women and boys' and girls' clubs. This work is supported by direct congressional appropriation to the department, but is done in cooperation with State colleges of agriculture, departments of agriculture and education, county governments and organizations, and others. In the cotton territory the work includes the teaching and demonstration of methods of meeting the ravages of the cotton-boll weevil.



*States.*—Texas, Oklahoma, Louisiana, Arkansas, Tennessee, Mississippi, Alabama, Georgia, Florida, South Carolina, North Carolina, Virginia, Maryland, West Virginia, and Kentucky.

*Scientific staff.*—County agent work: W. B. Mercier, assistant chief; I. O. Schaub, agriculturist and field agent for Virginia, Arkansas, Louisiana, Tennessee, and North Carolina; H. E. Savelly, agriculturist and field agent for Mississippi, Alabama, South Carolina, Georgia, and Florida; E. A. Miller, agriculturist and field agent for Texas, Oklahoma, Kentucky, Maryland, and West Virginia. Home demonstration and club work: O. B. Martin, assistant in general charge; Ola Powell, assistant in charge home demonstration and girls' club work; Madge J. Reese and Hannah L. Wessling, assistants in home demonstration work; Frantz P. Lund, specialist in drying and canning; I. W. Hill, assistant in charge; and C. L. Chambers, assistant in boys' agricultural club work.

H. W. Barber, assistant in charge of crop records and statistics.

W. H. Conway and F. M. McLaughlin, executive assistants.

Specialists detailed by subject-matter divisions of the department to act through the Office of Extension Work in the South in relation to the field work in the various Southern States: C. L. Goodrich, representing farm management; W. R. Beattie, representing horticulture; G. O. Gatlin, representing marketing.

*Field extension staff.*—Directors of extension, 15. County agent and boys' club work (men agents): 12 State agents, 25 assistant State agents, 60 district agents, 817 county agents, 35 assistant county agents, 45 special community leaders in club work, 151 colored local agents. Home demonstrations and girls' club work (women agents): 15 State agents, 19 assistant State agents, 56 district agents, 560 county agents, 68 colored local agents. Total, 1,878.

#### Office of Extension Work in the North and West.

C. B. SMITH, *Chief*; T. W. HARVEY, *Assistant to Chief*.

#### Relations with Extension Divisions of Agricultural Colleges in 33 Northern and Western States.

Under this head the office cooperates with the extension divisions of the State agricultural colleges within its territory in their plans and expenditures for extension work in agriculture and home economics under the act of Congress of May 8, 1914. It also acts as an agency for coordinating the extension work of the several bureaus of the department with similar work carried on by the agricultural colleges.

#### Farmers' Cooperative Demonstration Work.

Under this head extension and demonstration work on subjects relating to agriculture, home economics, and rural life generally is carried on through practical demonstrations and instruction under the supervision and management of State, district, and county agents working through organizations of farm men and women and boys' and girls' clubs. This work is in cooperation with State colleges of agriculture, county governments and organizations, and others. Demonstrations in farm management form a special line of work.

*States.*—Arizona, California, Colorado, Connecticut, Delaware, Idaho, Illinois, Indiana, Iowa, Kansas, Maine, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, South Dakota, Utah, Vermont, Washington, Wisconsin, and Wyoming.

*Scientific staff.*—County agent work: W. A. Lloyd, agriculturist in charge; H. W. Gilbertson, M. C. Wilson, and H. W. Hochbaum, agriculturists. Extension work with women: Florence E. Ward, assistant agriculturist, in charge; Miriam Birdseye, Grace E. Frysinger, Edith C. Salisbury, and Agnes E. Harris, assistants. Boys' and girls' club work: G. E. Farrell, agriculturist, in charge; Ivan L. Hobson, Gertrude L. Warren, Milton Danziger, and R. G. Foster, assistants. Farm management demonstrations: H. C. M. Case, farm economist, in charge. Cooperative relations, projects, and administrative subject-matter specialists: A. B. Graham, extension specialist, in charge; H. J. Wilder, assistant; O. S. Fisher, agriculturist, extension specialist in soils; C. P. Close, extension specialist in pomology; R. H. Elsworth, extension specialist in cooperative marketing; Helmer Rabild, extension specialist in dairying; W. R. Beattie, extension specialist in vegetable gardening; F. E. Kempton, extension specialist in barberry eradication.

M. M. Thayer, executive assistant.

*Field extension staff.*—Directors of extension, 33. County agent work: 29 State leaders, 55 assistant State leaders, 1,097 county agents and assistant county agents. Boys' and girls' club work: 28 State leaders, 57 assistant State leaders, 258 local or



county leaders. Farm management demonstrations: 22 State demonstrators, 4 assistant State demonstrators. Extension work with women: 29 State leaders, 21 assistant State leaders, 225 county home demonstration agents, 11 city home demonstration leaders.

#### Office of Home Economics.

C. F. LANGWORTHY, *Chief*; MINNA C. DENTON, *Assistant Chief*.

#### Studies of Food, Dietetics, Clothing, and Household Equipment, Work, and Management.

The Office of Home Economics investigates, both from the scientific and practical standpoint, the nature and uses of agricultural products utilized in the home for food, clothing, and equipment, and the methods of household work and management. The publications reporting work of the Office of Home Economics make available to housekeepers, teachers, students, and extension workers the results of such studies and the results of practical experience gathered in the home and elsewhere. Respiration calorimeter investigations include a study of food and household work with particular reference to energy values and efficiency. Special respiration calorimeter investigations on the factors which affect the successful storage of fruits and other food materials and other subjects included within the work of the department are carried on in cooperation with the different bureaus.

*Scientific staff.*—Helen W. Atwater, Ilena M. Bailey, H. G. Barott, Charlotte E. Chatfield, Samuel C. Clark, Walter B. Emerson, Rosalie S. Godfrey, Caroline L. Hunt, Mabel A. Nye, Louise B. Pritchett, Ruth Van Deman, and Fanny W. Yeatman.

#### BUREAU OF PUBLIC ROADS.

*Chief of Bureau.* THOMAS H. MACDONALD; *Chief Engineer*, P. ST. J. WILSON; *Assistant Chief Engineer*, E. W. JAMES; *Assistant to the Chief*, C. D. CURTISS; *Chief of Highway Economics*, R. H. HESS; *General Inspectors*, T. WARREN ALLEN, H. K. BISHOP, and L. I. HEWES.

In addition to the work comprised in the regular appropriations of the Bureau of Public Roads, the administration of the Federal aid road act has been intrusted by the Secretary of Agriculture to the chief of the bureau.

The organization of the bureau is divided into four main branches, known, respectively, as (1) Highway Engineering, (2) Highway Economics, (3) Tests and Research, and (4) Agricultural Engineering. The Highway Engineering branch deals with the highway engineering activities of the bureau under both the Federal aid road act and the regular appropriations, except highway engineering economics and tests and research. The Highway Economics branch deals with highway economic work under the regular appropriations and the Federal aid road act. The Tests and Research branch is responsible for the routine testing of road materials and conducts research along lines of highway construction under both the regular appropriations and the Federal aid road act. The Agricultural Engineering branch deals with all activities comprised under the regular appropriations for drainage investigations, irrigation investigations, and rural engineering investigations.

The Bureau of Public Roads, under the direction of the Secretary of Agriculture, administers the operation of the Federal aid road act, under which aid is granted to the several States in the construction of rural post roads; has charge of the survey, construction, and maintenance of roads in and adjacent to the national forests for which appropriation is made in section 8 of the Federal aid road act; cooperates with the Forest Service on road work conducted with the proceeds of the 10 per cent appropriation from forest receipts; investigates methods of road construction and maintenance; constructs experimental roads to demonstrate and test methods and materials of construction; details engineers to instruct local officials in road building by supervising object-lesson roads; gives advice to State and county authorities on all matters relating to road construction, maintenance, and management; investigates systems of road management; investigates the location, properties, and economic values of road materials; studies traffic regulations; investigates the effects of traffic on road surfaces and subgrade; compiles statistics relating to public roads; conducts educational work through lectures, the distribution of lantern slides, and the exhibit of models; investigates and reports upon the drainage of farms and of swamps and other wet lands otherwise available for agriculture; conducts field experiments and investigates in regard to construction and equipment in farm drainage systems; gives advice and assistance in farm drainage; investigates and reports con-

cerning the best methods of utilizing water in farm irrigation and concerning the development of the most efficient equipment for farm irrigation; studies the duty, apportionment, and measurement of irrigation water, and the customs, laws and regulations affecting irrigation; gives advice and assistance in farm irrigation; investigates domestic water supply and drainage disposal of the farm; investigates methods of lighting, heating, and ventilating farm homes; investigates, gives advice, and prepares plans for the construction of farm homes and structures; gives advice in regard to farm machinery and other rural engineering problems.

#### Highway Engineering.

P. ST. J. WILSON, *Chief Engineer*; E. W. JAMES, *Assistant Chief Engineer*; A. R. LOSH, *Assistant Engineer in Forest Road Work*; O. L. GROVER, *Bridge Engineer*.

*Post-road construction and forest-road construction and maintenance.*—This work covers the construction of rural post roads in cooperation with the State highway departments, and the survey, construction, and maintenance of national forest roads in cooperation with the Forest Service and State and local authorities.

For convenience in handling the work 13 districts have been established, as follows: No. 1, Oregon, Washington, and Alaska; No. 2, California; No. 3, Colorado and Wyoming; No. 4, Minnesota, Wisconsin, North Dakota, and South Dakota; No. 5, Nebraska, Kansas, Missouri, and Iowa; No. 6, Texas, Oklahoma, Arkansas, and Louisiana; No. 7, Illinois, Indiana, Kentucky, and Michigan; No. 8, Alabama, Georgia, Florida, Mississippi, Tennessee, and South Carolina; No. 9, Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont; No. 10, Delaware, Maryland, Ohio, Pennsylvania, North Carolina, Virginia, and West Virginia; No. 11, Montana and Idaho; No. 12, Nevada and Utah; No. 13, Arizona and New Mexico.

*District engineers.*—District No. 1, C. H. Purcell; District No. 2, C. H. Sweetser; District No. 3, J. S. Bright; District No. 4, E. O. Hathaway; District No. 5, J. C. Wonders; District No. 6, J. D. Fauntleroy; District No. 7, J. T. Voshell; District No. 8, A. E. Loder; District No. 9, G. H. Miller; District No. 10, V. M. Peirce; District No. 11, T. M. Keene; District No. 12, B. J. Finch; District No. 13, E. S. Wheeler.

#### Road Building and Maintenance Investigations.

These investigations cover the building of object-lesson roads and object-lesson bridges; the development of county road systems; making inspections and giving expert advice on road and bridge construction; the superintendence of county roads; the making of road surveys; systems of road maintenance; the maintenance of object-lesson, experimental, and post roads; conducting object lessons in road maintenance; the construction of roads within the national forests, in cooperation with the Forest Service; the preparation of typical plans for highway bridges and culverts; and experiments with bridge materials.

#### Field Experiments.

This work comprises the construction of experimental roads in cooperation with local administrative units for the purpose of demonstrating the best methods of constructing new types of roads and of studying the effect upon these roads of traffic under known conditions; investigations concerning various road materials and preparations.

*Highway Engineering staff.*—M. J. Adams, E. S. Alderman, C. Anderson, W. J. Anderson, L. G. Bayley, R. M. Bennett, H. L. Bowlby, W. F. Brooks, C. L. Brown, E. C. Brown, L. R. Brown, A. G. Bruce, H. E. Burke, G. L. Campen, J. C. Carpenter, L. J. Caulfield, L. J. Charles, C. W. Cheatham, L. F. Clark, M. J. Cramer, W. A. Crossland, L. W. Cummings, R. F. Eastham, J. A. Elliott, P. H. Everett, R. B. Everts, F. H. Flint, W. N. Frickstad, George Fuller, Mack Galbreath, H. S. Gillette, B. E. Gray, J. L. Harrison, R. H. Harrison, R. Heaney, B. F. Heidel, D. E. Henry, F. D. Hudgins, F. M. Johnson, J. W. Johnson, E. E. Kidder, F. A. Kittredge, C. C. Learned, H. H. Lotter, W. H. Lynch, H. G. McKelvey, C. L. McKesson, M. L. Mackey, G. T. MacNab, J. T. Marshall, B. W. Matteson, F. W. Mills, jr., J. E. Mincher, J. W. Moore, C. C. Morris, H. J. Morrison, J. W. Ogier, A. I. Ostrander, A. E. Palen, J. T. Patterson, A. C. Rapelje, C. E. Raynor, W. H. Rhodes, E. F. Ruggles, G. C. Scales, J. T. Schuyler, S. R. Sharts, C. Shoemaker, E. P. Shuman, E. C. Slocumb, W. V. Smiley, W. H. Snyder, J. A. Sourwine, C. H. Stillman, B. F. Taylor, H. J. Taylor, S. L. Taylor, D. R. Thornton, R. E. Toms, V. E. Towles, H. C. Wells, C. A. Welton, G. C. White, J. A. Whittaker, M. W. Wilbur, E. J. Wulff, W. H. Waugh, senior highway engineers; O. L. Grover, bridge engineer; H. R. Angwin, J. R. Chamberlain, L. F. Copeland, L. N. Edwards, A. F. Gordon, W. P. Linton, J. V. McNary, G. W. Mayo, C. D. Snead, G. D. Whittle, R. B. Wright, senior highway bridge engineers; L. E. Boykin, assistant in road management; E. E. Albee, A. P. Anderson, F. E. Andrews, J. H. Ayres, J. W. Ball, G. T.

Beattie, B. F. Beezley, F. S. Berry, C. F. Bidgood, R. T. Bloodsworth, G. A. Bracher, W. Brewster, A. B. Brown, E. L. Brown, R. D. Brown, W. H. Carnrike, R. S. Corlew, C. W. Cross, F. Davis, T. M. Davis, R. L. Devereaux, A. C. Dunn, E. G. Edwards, J. F. English, H. D. Fallon, G. E. Ferguson, G. J. Goehl, W. L. Greenlun, F. S. Hackley, W. F. Hart, B. B. Hauser, A. A. Hawkinson, J. B. Hawley, C. L. Hayward, H. J. Hemstreet, C. A. Hogentogler, A. L. Hooper, E. M. Hulce, W. M. Jeffrey, W. R. Johns, J. V. Johnson, B. F. Kitt, F. A. Knight, H. L. Leland, H. A. Levison, J. C. Lewin, P. Linford, C. T. McGinley, H. J. McKenney, R. B. MacKenzie, H. P. Martin, J. L. Mathias, R. E. Merrick, T. R. Mini, R. R. Mitchell, A. F. Morris, J. Moskowitz, Karl Moulton, M. A. Murray, J. M. Myers, S. A. Obenshain, J. E. Obermuller, J. M. Page, J. T. Pauls, C. E. Perkins, W. G. Peters, T. C. Peterson, H. R. Postle, F. R. Quackenbush, E. B. Rhine, A. C. Rose, L. H. Schwartz, W. J. Scofield, F. P. Sexton, J. D. Shaw, R. H. Shoemaker, H. M. Smith, J. H. Stone, G. H. Sykes, St. C. T. Thomas, H. S. Tolen, J. H. Tuttle, E. J. Wakefield, W. J. Ward, E. S. Warner, C. R. Whitaker, M. D. Williams, R. G. Williams, A. V. Williamson, H. O. Wray, J. H. Young, highway engineers; J. S. Clay, H. D. Farmer, C. D. Geisler, L. M. Huggins, C. T. Nitteberg, R. Pearson, C. W. Pierce, highway bridge engineers; O. E. Gardner, R. B. McMin, junior highway bridge engineers; W. M. Austin, L. T. Botto, W. L. Bowen, C. F. Capes, J. H. Eldridge, D. G. Haire, C. T. Harrison, W. J. Hoskyn, D. L. MacBeath, C. H. Semper, L. E. Smith, E. Tarry, superintendents of road construction; E. E. Avery, K. C. Balcomb, G. D. Ball, P. A. Bean, N. Bower, W. L. Bradley, F. H. Cotter, S. S. Crenshaw, W. H. Curwen, R. L. Downing, W. T. Eddy, E. R. Epperson, D. G. Evans, E. Gilgen, F. P. Gowan, L. A. Hamilton, W. J. Horsley, W. F. King, G. F. Leslie, B. McAtee, J. M. Marshall, L. F. Martin, J. J. Maucini, D. Murphy, B. A. Price, J. G. Rose, J. A. Ryder, L. L. Schremp, J. S. Scofield, C. J. Seymour, E. A. Shafer, H. C. Simmins, J. D. Slye, R. P. Smilie, F. W. Smith, S. A. Wallace, J. A. West, chiefs of road survey party; J. E. Anderson, L. D. Asmus, P. C. Beebe, G. E. Bevans, F. R. Bonnickson, C. M. Boren, M. C. Bowman, C. S. Bruning, S. J. Caperton, A. C. Clark, S. Cook, L. W. Dennie, C. F. Dixon, A. V. Emery, C. J. Fitchett, W. H. Goodrich, R. J. Hale, G. F. Hellesoe, F. C. Hill, R. Hoover, A. B. Humason, J. E. Jensen, R. C. Jones, T. A. Jones, W. J. Keller, W. L. Lafferty, D. W. Lamb, J. A. Lapraik, J. Lissner, M. F. McCoy, E. J. McCracken, R. A. Mack, D. G. O'Reardon, C. G. Polk, M. H. Potter, H. P. Purington, R. R. Reed, J. B. Reher, J. I. Roberts, C. Short, J. A. Skans, G. F. Spurrier, R. Thirion, R. I. Thomas, G. S. Vincent, F. J. Wallace, W. R. F. Wallace, R. D. Walton, M. F. Wildman, transitman for road surveys; T. L. Ainsworth, J. Brannan, R. W. Darling, T. A. Hafford, I. W. Hall, H. C. Headley, H. H. Kuphal, F. B. Lessman, M. Lloyd, O. C. Lockhart, E. Lubeck, G. W. Macrum, A. J. A. Meehan, Lou Alta Melton, D. B. Murphy, F. A. Nickols, L. W. Schlegel, H. F. Tripp, L. W. Turoff, G. H. Waddell, F. S. Welkman, Elizabeth M. Boyter, Ellen De V. Butler, engineer and highway draftsmen.

#### **Equipment Division of Engineering Branch.**

This division has supervision and control over all machinery, equipment, and property of the bureau, particularly that which has been received by transfer from the War Department, and machinery and equipment used in road construction.

*Equipment Division staff.*—E. B. McCormick, chief of division; Elmer Johnson, agricultural engineer; D. K. Sheppard, chief of road-survey party; C. S. Haynes, architectural draftsman.

#### **Highway Economics.**

This work in general embraces engineering economics relating to highways; legislative investigations and investigations in highway administration; the collection and compilation of statistical data; the management of educational work, which is conducted by means of lectures, exhibits, and publications; and advisory work with reference to economics, legislation, and highway administration and management.

*Highway Economics staff.*—H. S. Fairbank, senior highway engineer; G. G. Clark, G. W. Davis, and A. L. Luedke, engineer economists; J. G. McKay, highway economist; H. W. Hendley, model maker; J. K. Hillers, jr., photographer.

#### **Tests and Research.**

A. T. GOLDBECK, *Engineer of Tests.*

These investigations cover the routine chemical testing and inspecting of dust preventives and road binders and materials allied to road construction; microscopic examination and classification of road-building rocks; research on properties of dust pre-



ventives and road binders; tests of the effect of vehicular wear and impact on road surfaces; standardization of methods of testing bituminous road materials; experimental bituminous road construction and maintenance; physical testing of road-building materials; nonbituminous road-material investigations; standardization of tests on nonbituminous road materials; and instrument making and repair.

*Tests and Research staff.*—F. H. Jackson, jr., and E. B. Smith, senior assistant testing engineers; L. L. Beebe and I. B. Mullis, assistant testing engineers; C. E. Proudley, junior assistant testing engineer; B. A. Anderton, chemist; L. G. Carmick, E. F. Strickler, chiefs of road-survey party; F. D. Hurwitz and L. W. Teller, transitmen for road surveys.

#### Agricultural Engineering.

S. H. MCCRORY, *Chief*; SAMUEL FORTIER, *Associate Chief*.

This branch is divided into three subdivisions, dealing, respectively, with (1) drainage investigations, (2) irrigation investigations, and (3) rural-engineering investigations.

#### Drainage Investigations.

These investigations embrace the following subjects: Methods of removing surplus water from lands having agricultural value; protection of lands from periodical overflow of streams; reclamation of tidal lands; control and conservation of rainfall on hillside lands; construction and maintenance of farm-drainage works; equipment for use in constructing and maintaining farm-drainage works; and costs and methods of organizing and financing community drainage projects.

#### Irrigation Investigations.

These investigations include the following subjects: Utilization of water in farm irrigations; pumping for irrigation; irrigation appliances and equipment; flow of water in ditches, pipes, and other conduits; measurement of water; customs, regulations, and laws relating to irrigation; drainage of irrigated lands; expert advice and assistance.

#### Rural Engineering Investigations.

These investigations involve the study of the domestic water supply and disposal of sewage on the farm; recommendations and plans for farm buildings and structures involved in rural improvement, with reference to convenience and economy; research, cooperative, and experimental demonstrations of rural problems involving an expert knowledge of mechanical principles.

*Drainage staff.*—H. H. Barrows, L. A. Jones, R. D. Marsden, G. R. Boyd, R. A. Hart, H. M. Lynde, D. G. Miller, J. V. Phillips, C. E. Ramser, F. F. Shafer, P. T. Simons, D. W. Yarnell, senior drainage engineers; B. S. Clayton, L. T. Jessup, G. L. Smith, F. E. Staebner, drainage engineers; Q. C. Ayres and A. O. Kay, junior drainage engineers; F. Boynton and W. D. Nichols, draftsmen.

*Irrigation staff.*—R. P. Teele, irrigation economist; Frank Adams, irrigation manager; F. L. Bixby, A. L. Fellows, W. W. McLaughlin, A. T. Mitchelson, R. E. Parshall, F. C. Scobey, C. E. Tait, M. B. Williams, senior irrigation engineers; S. H. Beckett, H. F. Blaney, D. W. A. Bloodgood, Guy Ervin, W. B. Gregory, S. T. Harding, R. G. Hemphill, J. C. Marr, Carl Rohver, irrigation engineers; T. H. McCarthy, junior irrigation engineer; P. A. Ewing, W. A. Hutchins, assistants in irrigation economics; E. J. Hoff, mechanician; L. M. Winsor, agent.

*Rural engineering staff.*—M. C. Betts, architect; H. R. Tolley, agricultural engineer; A. M. Daniels, assistant mechanical engineer; M. A. R. Kelley, barn architect; G. M. Warren, hydraulic engineer; T. A. H. Miller, estimator; W. R. Humphries, assistant in rural engineering; N. Buckingham and G. L. Edick, rural engineering draftsmen; Lillian Church, assistant in farm accounting.

#### BUREAU OF MARKETS.

*Chief*, GEORGE LIVINGSTON; *Associate Chief*, LEON M. ESTABROOK; *Assistant Chief*, CHESTER MORRILL.

The Bureau of Markets was formed to acquire and diffuse among the people of the United States useful information on subjects connected with the marketing and distribution of farm and nonmanufactured food products. Specifically, its studies cover such subjects as: Market conditions; demand for specific crops; sources of supply; transportation and storage of farm products; methods of grading, standardizing, packing, and shipping farm products; the economic aspects of the transactions involved in the movement of farm products from the farm to the consumer; waste in marketing; cost of marketing; methods of accounting and business practice for agencies marketing farm products; and the cooperative association of farmers for marketing farm prod-



ucts and purchasing farm supplies. An inspection service is conducted to determine the quality and condition of fruits, vegetables, and butter, when received at important central markets, and reports are issued to show the amounts of certain food products held in cold storage. Market news services are conducted on fruits, vegetables, and peanuts; live stock and meats; dairy and poultry products; and hay, feeds, and seeds. Regulatory work is conducted in connection with the enforcement of the United States cotton futures act, the United States grain standards act, and the United States standard container act. The bureau also is charged with the administration of the warehouse act, and with the completion of the audit and liquidation of the accounts of the Domestic Wool Section of the War Industries Board.

*Administrative staff.*—Branch of operation, R. V. Bailey, C. L. Snow; personnel, F. J. Hughes; estimates, allotments, and reports, Cornelia Lyne; supplies and accounts, P. H. Quinn; librarian, Mary G. Lacy; secretary to chief, Catherine M. Viehmann.

### Division of Live Stock, Meats, and Wool.

STEPHEN BRAY, *Specialist in Marketing Live Stock and Meats.*

**Marketing Live Stock, Meats, and Wool.** C. V. WHALIN, *Investigator in Marketing Live Stock and Meats*, and G. T. WILLINGMYRE, *Specialist in Marketing Wool*.

A systematic study of existing live-stock markets and systems of marketing is in progress, including transportation and stockyard facilities, and the various agencies, including cooperative associations, for the distribution of live stock, meats, and animal products. Market classes and grades for live stock have been formulated and demonstrations are made to illustrate these classes and grades, investigations are made concerning the marketing of hides and skins and of purebred live stock. The marketing of wool is studied and reports dealing with the supply and consumption of wool are issued. Tentative wool standards have been prepared and are being distributed.

*Scientific staff.*—L. B. Burk, investigator in marketing live stock and meats; D. W. Willingmyre, investigator in marketing wool; C. D. Ashmore, W. E. Doble, and C. E. Gibbons, assistants in marketing live stock and meats; C. A. Burmeister, assistant in market information; and W. A. Mueller, assistant in marketing wool.

**Market Reports on Live Stock and Meats.** E. W. BAKER, *Investigator in Marketing Live Stock and Meats*, and W. C. DAVIS, *Assistant in Marketing Live Stock and Meats*.

Reports are issued as follows: (1) Daily market reports on meat-trade conditions which show prices, supply, demand, and trend of the market for beef, veal, pork, pork products, and lamb and mutton in Boston, Chicago, New York City, and Philadelphia; (2) daily reports on live stock at Chicago, East St. Louis, Kansas City, Omaha, and St. Paul, showing prices, receipts, demand, and trend of the market for cattle, calves, hogs, and sheep; (3) weekly summaries of live-stock market conditions and prices at the above-named centralized live-stock markets; (4) weekly summaries of meat trade conditions and prices which are issued every Saturday morning; and (5) various news items and trade reviews containing general information relating to trade conditions in the live-stock and dressed-meat markets, and weekly and monthly statistical reports of live-stock and dressed-meat supplies, movements, and prices published in the weekly Market Reporter.

*Scientific staff.*—C. V. Whalin, investigator in marketing live stock and meats; H. W. Mumford and A. F. Stryker, consulting specialists; C. D. Ashmore, C. H. Beauchamp, Charles Bruce, J. A. Burgess, J. S. Campbell, V. E. Foster, H. W. French, C. E. Gibbons, M. Y. Griffin, C. M. Harris, E. K. Hess, L. Hubbard, H. D. Knoop, E. Lende, O. J. Thompson, D. J. Slater, D. L. Swanson, and J. K. Wallace, assistants in marketing live stock and meats; C. A. Burmeister and N. R. Crow, assistants in market information; and John H. Ruff, assistant live stock market supervisor.

### Division of Dairy and Poultry Products.

ROY C. POTTS, *Specialist in Marketing Dairy Products.*

**Marketing Dairy Products.** ROY C. POTTS, *Specialist in Marketing Dairy Products.*

In this work field surveys and investigations are made of the marketing of dairy products and dairy substitutes, including methods and costs of their preparation for market, market grades and classification, market quotations and quotation systems, selling agreements, merchandising, advertising, and marketing facilities and methods, market supplies, requirements and conditions, producers' problems and related subjects

in order to suggest measures by which market conditions and marketing methods may be improved, and the costs of marketing dairy products reduced.

*Scientific staff.*—Leon M. Davis, C. W. Fryhofer, and John B. McCready, assistants in marketing dairy products.

**Market News Service on Dairy and Poultry Products.** LEON M. DAVIS, *Assistant in Marketing Dairy Products.*

The market news service on dairy and poultry products includes the collection and publication of data regarding the amount of manufactured milk products produced in the United States, market receipts, market supplies, prices of fluid milk, butter, cheese, condensed and evaporated milk, and eggs, and other information in regard to market conditions which may be of value to producers, distributors, and consumers in intelligently directing their sales and purchases of such products.

*Scientific staff.*—J. S. Brown, John B. McCready, Leon E. Gaylord, Albert B. Loring, Nick Fennema, Frank H. McCampbell, O. S. Hagen, Raymond L. Feddersen, and Norman A. Dakin, assistants in marketing dairy products.

**Butter-Inspection Service.** C. W. FRYHOFFER, *Supervising Inspector of Dairy Products.*

Butter inspections are made at Boston, Chicago, New York, and Philadelphia under the authority contained in the appropriation bill, which enables the Secretary of Agriculture to investigate and certify to shippers and other interested parties the quality and condition of fruits, vegetables, poultry, butter, hay and other perishable farm products when received at important central markets..

*Scientific staff.*—A. B. Loring, O. S. Hagen, R. L. Feddersen, N. Fennema, N. A. Dakin, L. E. Gaylord.

#### Division of Fruits and Vegetables.

WELLS A. SHERMAN, *Specialist in Marketing Fruits and Vegetables.*

**Marketing Fruits and Vegetables.** WELLS A. SHERMAN, *Specialist in Marketing Fruits and Vegetables*, and H. W. SAMSON, *Specialist in Standardization.*

To study the processes involved in packing and preparing fruits and vegetables for market with a view to encouraging the best commercial methods and for the purpose of developing grades and standards for fruits and vegetables and the containers in which they are marketed; to study the commercial and economic aspects of the construction, arrangement, equipment and management of fruit and vegetable packing houses; to promote the adoption and use of the grades, standards, methods of sizing, packing, and preparing for the market which may be recommended as a result of these investigations; to supplement the information secured by the Bureau of Crop Estimates by collecting information concerning probable production of fruits and vegetables; and to obtain comprehensive and detailed information concerning the origin, movement, distribution, and consumption of these crops and the various agencies by and through which they are distributed and sold.

*Scientific staff.*—H. E. Truax, G. B. Fiske, Robert Bler, E. W. Stillwell, and F. E. Parsons, investigators in marketing fruits and vegetables; R. L. Lepper, assistant in market surveys.

**Market News Service on Fruits and Vegetables and Peanuts.** C. W. KITCHEN, *Specialist in Market News.*

A telegraphic market news service covering the commercial movement and prevailing market prices of the principal fruit and vegetable crops is given. Branch offices have been established in several of the metropolitan markets, and these, in connection with temporary offices located in producing territory during crop movement, constitute centers for the distribution of all available information. The information which is made public includes reports from the markets where branch offices are located covering receipts, market conditions, and prevailing wholesale prices; telegraphic advices from railroad officials in all parts of the country, giving shipments of the commodities which are being reported; and f. o. b. information furnished by field men in shipping areas. During the major portion of the year daily bulletins are issued from the permanent city offices and from the various temporary offices in commercial producing territory. Market reports on peanuts also are issued.

*Scientific staff.*—B. C. Boree, H. J. Clay, Paul Froehlich, L. A. Dellwig, L. H. Martin, W. O. Smith, jr., Lucy Watt, V. D. Callanan, B. E. Yaden, W. H. Hall, D. C. Rogers, M. S. Wiggins, E. R. Biddle, R. S. Lumbard, W. H. Stanton, W. Kingsbury, E. M. Seifert, jr., H. A. Harris, assistants in market surveys; P. M. Williams, assistant in marketing fruits and vegetables; Lee R. Miller, W. E. Harrison, Edward L. Dilatush, investigators in marketing fruits and vegetables; O. D. Miller, scientific assistant in marketing; R. M.

Peterson, investigator in market surveys; and J. W. Law, R. H. Shoemaker, and W. C. Russell, food products, inspectors; W. L. Evans, executive assistant; Geo. E. Prince, assistant in package standardization; Clark E. Schultz, assistant in market surveys; C. L. Brown, scientific assistant; and James K. Boyd, agent in marketing.

**Market Inspection of Fruits and Vegetables.** F. G. ROBB, *Specialist in Food Products Inspection.*

Inspectors are maintained at the principal markets to investigate and certify to shippers and other interested parties the quality and condition of fruits and vegetables upon their arrival at these markets. The object of this service is to establish an unbiased basis for the adjustment of differences among growers, shippers, and wholesalers, and transportation companies, and to conserve the supply of the products affected by facilitating their movement and sale.

*Scientific staff.*—R. C. Butner and A. D. Gail, jr., supervising inspectors; Fred J. Baehler, assistant supervising inspector; G. K. K. Link, D. H. Rose, and F. C. Meier, pathologists; E. H. Mueller, F. S. Kinsey, H. Beckenstrater, M. L. Henry, S. F. Shreve, G. W. Payne, G. C. Bayley, E. J. Maynard, R. C. Rose, M. A. Russell, J. M. Rogers, B. E. Yaden, C. D. Shirley, L. J. Case, L. G. Schultz, O. G. Strauss, H. A. Arenz, W. G. Thompson, H. H. Henderson, A. E. Mercker, W. V. Stephens, F. Wolfarth, V. V. Westgate, W. C. Hackelman, M. L. Benn, E. E. Conklin, jr., T. C. Curry, J. W. Law, T. L. Kelly, W. Kingsbury, W. K. Makemson, G. R. Warren, Marvin C. Gregory, Walter Plummer, J. B. Wright, and Ray C. Bish, inspectors; John J. Gardner, investigator in marketing fruits and vegetables; Paul W. Barnes, assistant in marketing fruits and vegetables; and William S. Reiterman, scientific assistant in marketing.

**Enforcement of the Standard Container Act.** H. W. SAMSON, *Specialist in Standardization.*

The object of this work as stated by the act itself is "to fix standards for climax baskets for grapes and other fruits and vegetables, and to fix standards for baskets and other containers for small fruits, berries, and vegetables, and for other purposes."

*Scientific staff.*—H. A. Spilman, assistant in package standardization.

**Division of Preservation of Perishable Food Products in Transit and Storage.**

**Preservation of Fruits and Vegetables in Transit and Storage.** C. W. MANN, *Pomologist.*

These investigations are made to encourage careful and efficient methods of handling, shipping, and storing fruits and vegetables so as to render them less liable to deterioration and decay in storage and in transit and to insure their arrival on the market in sound condition.

The efficiency of refrigerator cars and equipment used in transportation, as affecting the condition of perishables in transit and on arrival at market terminals, and the relation of precooling and icing practices and methods of loading to the successful transportation of these products are investigated. The influence of temperature and humidity on the keeping quality of fruits and vegetables in refrigerated or common storage, the temperature at which these products may be injured by freezing or "chilling," methods of preservation by freezing storage, and the construction and functioning of storage warehouses are studied in this project. Certain phases of these investigations are conducted in cooperation with projects in the Bureau of Plant Industry carrying on closely related work.

*Scientific staff.*—S. J. Dennis and L. W. Collins, refrigeration technologists; D. B. Carrick, specialist in fruit transportation; Howard E. Kramer, specialist in ocean transportation; H. Graff, R. G. Hill, and Raymond R. Pailthorp, investigators in marketing; Walter L. Conkey, assistant in preservation of fruits and vegetables; and V. G. Gibson, scientific assistant.

**Division of Cotton Marketing.**

WM. R. MEADOWS, *Cotton Technologist, Acting in Charge.*

**Administration of the United States Cotton Futures Act.** WM. R. MEADOWS, *Cotton Technologist.*

To supervise and direct work of enforcing the United States cotton futures act, and the rules and regulations of the Secretary of Agriculture thereunder.

**Future and Spot Market Investigations and Cotton Price Quotations under the United States Cotton Futures Act.** CHESTER MORRILL, *Supervisor of Enforcement.*

To investigate future markets for cotton to ascertain how accurately their future quotations reflect spot values, and to secure general information as to conditions within



the future exchanges; to investigate spot markets to determine their fitness for designation as bona fide spot markets; to secure daily reliable quotations for cotton from each designated spot market; to inspect the designated bona fide markets from time to time; to secure from primary and terminal spot markets accurate quotations and general publication of the prices of spot cotton of the various grades, including grades untenderable on future contracts (a) in order that cotton of grades other than middling delivered on future contracts made subject to section 5 of the United States cotton futures act may be settled for at the proper commercial differences in value, so that the prices of such contracts may reflect as nearly as practicable the actual values of spot cotton; and (b) in order that producers, merchants, and others interested in spot cotton may have accurate information as to the prices of such cotton, and particularly grades untenderable on such future contracts.

*Scientific staff.*—A. M. Agelasto and Bertram R. Oastler, specialists in cotton classing; Thomas W. Tannor and Arthur W. Palmer, specialists in cotton marketing; Newton T. Bringham, assistant in cotton grading; B. I. Busby, jr., assistant in cotton classing; and Fred E. Nelson, assistant in cotton business methods.

#### **Classification of Cotton under the United States Cotton Futures Act. H. C.**

SLADE, *Specialist in Cotton Marketing.*

To supervise the inspection and sampling of and to classify cotton for the purposes of tender and delivery thereof on future contracts made on exchanges subject to section 5 of the United States cotton futures act as amended by the wheat price guaranty act, approved March 4, 1919.

*Scientific staff.*—Board of cotton examiners, New York; Wingate P. Barbot, specialist in cotton classing, chairman; William I. Holt and William E. Dent, specialists in cotton classing; R. P. Kohlheim, supervisor of cotton inspection; John O. Hillis, assistant in cotton classing; and Sidney K. Knoller, assistant in cotton grading. Board of cotton examiners, New Orleans; H. J. Cassidy, specialist in cotton classing, chairman; R. J. Bosworth and J. J. Haggerty, specialist in cotton classing; and Arthur W. Palmer, supervisor of cotton inspection.

#### **Preparation and Distribution of Official Cotton Standards under the United States Cotton Futures Act. H. C. SLADE, *Specialist in Cotton Marketing.***

To prepare and distribute practical forms of the official cotton standards of the United States promulgated by the Secretary of Agriculture under section 9 of the United States cotton-futures act, to inspect copies of the standards, condemn them when necessary, and replace them upon request.

*Scientific staff.*—Joseph M. Byrnes, specialist in cotton marketing; R. L. Kause, A. M. Agelasto, Harvey C. Ryan, and A. C. Poulton, specialists in cotton classing; G. P. Taylor, S. W. Holman, and L. T. Rhea, assistants in cotton classing; and W. S. Lanier and Grover B. Gilbert, assistants in cotton grading.

#### **Investigation and Demonstration of Cotton Standards. H. C. SLADE, *Specialist in Cotton Marketing*, and GUY S. MELOY, *Investigator in Cotton Marketing*.**

Under this head are made investigations of standards for the different grades, qualities, and conditions of cotton. Studies are made relative to the length of staple of cotton, cotton of perished or immature staple, and gin-cut cotton, reginned cotton, and cotton linters. When practicable, grading experts demonstrate the use of the official standards to communities of cotton growers in order to secure more uniform grading in connection with spot-cotton transactions and to promote the use of the official cotton standards of the United States.

*Scientific staff.*—P. H. Hart, specialist in cotton marketing; A. M. Agelasto, specialist in cotton classing; and John K. Woods, assistant in cotton classing.

#### **Cotton Testing. W. G. BLAIR, *Assistant in Cotton Testing*.**

Under this project tests are made of the waste, tensile strength, and bleaching and spinning qualities of the different grades, classes, and varieties of cotton in order to determine their commercial and spinning values.

*Scientific staff.*—H. B. Richardson, C. E. Folk, and Edward S. Cummings, assistants in cotton testing.

#### **Cotton Marketing Demonstrations. GUY S. MELOY, *Investigator in Cotton Marketing*.**

To demonstrate to growers the advantage to be gained by (a) classing cotton before sale and possessing accurate knowledge as to the current market prices for cotton of various grades and lengths of staple; (b) marketing on a basis of true value and not on a basis of averages; (c) organizing on a community basis for growing cotton of a single superior variety from pure seed and for marketing the cotton grown in such



communities in commercial lots even running as to grade and staple; (d) using warehouses for protecting cotton and as a business adjunct to orderly marketing.

*Scientific staff.*—John B. Beers, specialist in cotton classing; Charles F. Mitchell, specialist in cotton classing; and Edgar A. Hodson and E. G. Parker, agents in cotton marketing.

**Cotton Handling Investigations.** R. L. NIXON, *Specialist in Warehousing.*

To acquire and disseminate useful information relating to (a) the amount and cause of so-called "country damage" in cotton, and the best methods of avoiding such damage; (b) the best methods of compressing cotton; (c) the proper covering of cotton so as to protect bales; (d) the elimination of unnecessary tare; and (e) other questions relating to the handling of cotton.

#### Division of Grain Marketing.

H. J. BESLEY, *Grain Supervisor.*

**Enforcement of the United States Grain Standards Act.** H. J. BESLEY, *Grain Supervisor*, assisted by R. T. MILES, *Grain Supervisor*.

This project includes the activities necessary to supervise and direct the investigational and regulatory activities involved in the enforcement of the United States grain standards act, and the rules and regulations of the Secretary of Agriculture thereunder.

*Scientific staff.*—E. J. Murphy and G. W. Morrison, assistants in grain supervision; J. Q. Adams, Harold Anderson, C. B. Barron, W. P. Carroll, G. F. Binderim, H. L. Binkley, P. J. Bollman, P. J. Brittain, C. L. Cannon, J. T. Cavanagh, J. M. Chilton, J. C. Dey, S. P. Fears, C. G. Franks, Lee Gallaher, E. J. Hickey, W. L. Ingles, R. D. Jarboe, Ed. Keiser, J. C. Kerr, F. L. Loos, W. H. McDonald, W. H. McMurtrey, J. F. McKenzie, J. R. Mathewson, R. C. Mill, R. C. Miller, A. F. Nelson, E. C. Noll, H. A. Rhoades, R. R. Saunders, Martin Schuler, W. H. Shea, R. E. Smith, T. A. Sommers, J. P. Stanfield, G. A. Stuart, F. L. Wallace, J. F. Welch, R. B. Woolsey, C. B. Wright, and R. C. Wright, grain supervisors; K. B. Seeds, specialist in grain marketing; W. M. Smith, investigator in marketing grain; J. E. Bohn, W. B. Combs, F. A. Cummings, William Cuning, H. P. English, R. W. Gilbert, M. T. Goedeke, H. F. Gray, C. W. Griffin, F. C. Hammer, H. S. Heilman, E. A. Hill, M. J. Johnson, William Knight, H. E. Nelson, W. A. Pahl, H. F. Prue, A. G. Roesser, C. F. Standring, R. W. Taylor, C. A. Waalen, and J. W. Wesson, assistant grain supervisors; H. M. Crosswhite, assistant in federal grain supervision; H. R. Hungerford, assistant in marketing grain; and E. A. Fombelle, scientific assistant in marketing grain and hay.

**Inspection Efficiency, United States Grain Standards Act.** R. T. MILES, *Grain Supervisor.*

This work includes the supervision of the inspection of grain in order to secure the correct and uniform application of the official grain standards of the United States; examination of grain which has been shipped or delivered for shipment in interstate or foreign commerce when sold, offered or consigned for sale by grade or which has been graded by a licensed inspector, for the purpose of determining whether it conforms to the standard of the grade specified; supervision of all records of grain graded and inspected by licensees under the act, the collection of reports and the compilation for publication of the summary of facts required by section 7 of the act.

*Scientific staff.*—J. H. Frazier, F. G. Smith, W. P. Carroll, Laurel Duval, E. L. Morris, Philip Rothrock, C. A. Russell and R. W. Whitlock, grain supervisors; J. T. Warner, assistant grain supervisor.

**Board of Review, United States Grain Standards Act.** O. F. PHILLIPS, *Grain Supervisor, Chairman.*

The Board of Review determines questions concerning interpretation of the official grain standards of the United States; it maintains uniform application of these standards by reviewing samples of grain inspected by Federal grain supervisors and licensed inspectors throughout the country, which samples come to the Board of Review through district offices of Federal grain supervision. The board also serves as a final body to which appeals may be taken by parties to a grain transaction in which either party may be dissatisfied with the grade assigned by a local district Federal grain supervisor to whom the party appealed from a grade originally assigned by a local licensed inspector.

*Scientific staff.*—W. J. O'Loughlin, J. E. Edwards, John Sheedy, J. A. LeRoy, B. W. Whitlock, G. K. Landers, W. F. Shanahan, V. P. Fawcett, grain supervisors; G. A. Hardgrove, assistant grain supervisor.

**Division of Enforcement, United States Grain Standards Act.** A. W. HERGER,  
*Assistant in Grain Supervision.*

This project is concerned with the investigation of alleged violations of the United States grain standards act, and the conduct of hearings in connection with the same.

*Scientific staff.*—H. B. Evans, C. L. Finch, assistants in federal grain supervision.

**Grain Investigations.** E. G. BOERNER, *Grain Supervisor.*

This project functions primarily as an organization to secure data for the purpose of enabling the Secretary of Agriculture to fix and establish official grain standards of the United States for grain under the United States grain standards act. This work involves investigations covering the milling and baking qualities of wheat and other grain and studies of the handling, transportation, grading, and storage of grain at country points and through the various channels of commerce.

*Scientific staff.*—B. E. Rothgeb and G. H. Baston, specialists in grain standardization; J. H. Cox, J. H. Shollenberger, W. D. Smith, and W. K. Marshall, grain supervisors; D. A. Coleman, investigator in grain standardization; E. N. Bates and A. L. Rush, investigators in grain handling; J. N. Arndt, investigator in grain dockage; G. P. Bodner, assistant in grain-dust explosions; R. H. Black and J. F. Hayes, assistants in marketing; R. L. Baldwin, C. H. Bennett, C. R. Haller, Alfred Christie, H. E. Earp, H. C. Fellows, H. B. Musser, and C. L. Phillips, scientific assistants in grain standardization.

**Division of Hay, Feed, and Seed Marketing.**

G. C. EDLER, *Specialist in Seed Marketing, Acting in Charge.*

**Hay, Feed, and Seed Marketing Investigations.** H. B. MCCLURE, *Specialist in Hay Marketing*, and G. C. WHEELER, *Investigator in Feed Marketing.*

This work covers the activities of all classes engaged in the handling of those commodities from grower to ultimate consumer. Detailed studies are made of the factors affecting the marketing of hay, feeds, and seeds, including methods of preparation, selling, shipping, warehousing, etc. The inspection, grading, commission, and reconsignment of hay at terminal markets is studied, and comparisons of the use, value, and fitness of the present conflicting sets of hay rules formulated by various State and hay trade associations are being made preliminary to the establishment of Federal hay grades.

*Scientific staff.*—G. A. Collier and Matt A. Crosby, assistants in hay marketing; J. E. Barr, assistant in seed marketing.

**Hay, Feed, and Seed Reporting Service.** G. A. COLLIER, *Assistant in Hay Marketing.*

This service gives growers, shippers, dealers, consumers, and others interested reliable information relative to prices, supply, demand, movement, receipts, shipment, and other factors that have a bearing on the hay, feed, and seed market at most of the distributing points throughout the country. The information is obtained by paid and voluntary correspondents in many hay, feed, and seed distributing and feed manufacturing centers and from country shippers and farmers. The salient features in the data obtained are published weekly in *The Market Reporter*, and four times a week in the *Weekly Marketgram*.

*Scientific staff.*—J. E. Barr, W. M. King, and G. B. Alguire, assistants in marketing; G. F. Kellogg and G. C. Wheeler, investigators in marketing.

**Marketing Statistics.**

CARL J. WEST, *Specialist in Marketing Statistics.*

This section was formed to make and keep current, in cooperation with the various divisions of the bureau, complete and comprehensive tabulations and chartings of data pertaining to the marketing and distribution of farm products. These data concern prices, receipts and shipments, amounts inspected or graded, stocks on hand including cold-storage holdings, amounts of farm products entering into manufacture, and other related subjects. Effort is made to analyze these data and present them at opportune times in a form useful to producers and consumers. Much of the material so prepared and analyzed appears in *The Market Reporter*.

*Scientific staff.*—Lewis B. Flohr, investigator in marketing; William F. Logan, assistant in grain exchange practice; Edna M. Jordan, assistant in marketing live stock and meats; Norman R. Angney, scientific assistant in marketing statistics; John O. Bell, assistant in market surveys; John W. Strowbridge, assistant in direct marketing; Mrs. June A. Hodgkins and Lynus C. Reynolds, scientific assistants.

**Market Information Service.**

W. A. WHEELER, *Specialist in Market Information.*

This section directs and supervises the issuance by the Bureau of Markets of The Market Reporter and Marketgrams and all other information, whether published in bulletin or other printed or mimeographed form, or made public by means of exhibits, motion pictures, lantern slides, photographs, or lectures.

*Scientific staff.*—Miller Hamilton, Frank F. George, jr., and Lucius S. Richardson, assistants in market information; Caroline B. Sherman and Katharine G. Rice, scientific assistants; Ruth B. Montgomery, junior assistant in market information; B. L. Perkins, assistant in market exhibits.

**Cost of Marketing Farm Products.**

**Retail Meat Investigations.** HERBERT C. MARSHALL, *Specialist in Economic Research.*

A special investigation is in progress concerning the marketing of meat through retail agencies. This includes study of such matters as the prevalence and comparative numbers of the various types of shops, such as straight meat market, combination grocery and meat market, stall in public market, and chain store; the relation of number of dealers to population in various communities and parts of the country; municipal abattoirs and the relation of local slaughter to the retail trade; methods of sale and meat distribution in rural districts; the extent to which systematic bookkeeping and accounting are utilized and various methods of advertising employed; the comparative prevalence of cash and credit and of delivery and nondelivery trade; costs of operation in the various types of stores and under the various methods of operation; sanitary conditions and State and local regulations; the relation of retail to wholesale prices and the methods followed by retailers in adjusting their business to sudden changes in wholesale prices; and various other matters of interest.

*Scientific staff.*—James Christensen, live stock market supervisor; Lloyd H. Van Kirk, investigator in market business practice; Robert M. Roudabush and L. G. Bartlett, assistants in market business practice; James N. Holson, assistant economist in marketing; and Mary E. Griffith, scientific assistant in marketing.

**Cost of Marketing.** LEWIS H. HANEY, *Specialist in Economic Research.*

Analytical cost studies are made for the purpose of measuring the losses, risks, and wastes of marketing and ascertaining the most economical marketing methods. Endeavor is made to secure a wider diffusion of accurate knowledge of marketing costs; to promote the use of cost accounting methods by agencies concerned with the marketing of farm products; and to introduce a greater uniformity in cost records. The business practices of cooperative and farmers' marketing, distributing, purchasing, and rural business organizations and other marketing agencies are investigated in order to devise suitable accounting systems and business practices for their use.

*Scientific staff.*—Kemper Simpson, associate specialist in economic research; A. V. Swarthout, investigator in market business practice; Wayne M. Stevens, investigator in marketing; J. H. Conn, E. J. Way, and H. F. Buchanan, assistants in market business practice; Frank Robotka, field agent in market business practice.

**State Cooperation in Marketing Work.**

LYOYD S. TENNY, *Assistant to the Chief.*

R. H. ELSWORTH, *Assistant in State Cooperation in Marketing.*

The object of this work is to carry on in cooperation with various State agencies investigational and demonstrational work in connection with the marketing and distributing of farm products. Agents in marketing are located in the cooperating States, to assist in marketing investigations and demonstrations.

*Scientific staff.*—In Washington, D. C., G. O. Gatlin, assistant, State cooperation in marketing; Arkansas, Turner R. H. Wright and T. Roy Reid; Colorado, W. F. Heppe and William F. Allewelt; Connecticut, Ellis Monroe; Iowa, E. G. Nourse and Frank Robotka; Louisiana, A. G. Hamilton; Maine, Charles M. White; Massachusetts, A. E. Cance and Robert J. McFall; Michigan, Hale Tennant and Willard C. Cribbs; Minnesota, Paul L. Miller and Edward S. Guthrie; Mississippi, T. M. Patterson, John F. McKay and R. H. Bryson; Missouri, Ralph Loomis and Daniel C. Rogers; Montana, John F. Ware; Nebraska, H. C. Filley and George R. Boomer; New Hampshire, R. W. Smith, New Mexico, C. A. McNabb; North Carolina, Gorrell Shumaker; North Dakota, W. R. Porter; Ohio, Thomas D. Phillips and Z. B. Wallin; Oregon, Hector Macpherson and Paul Mehl; South Carolina, Fred L. Harkey and L. H. Lewis; Utah, George B. Hendricks; Vermont, Lionel G. Mulholland; Virginia, J. H. Meek; Washington, Joseph Passonneau.



**Foreign Marketing Investigations.**E. G. MONTGOMERY, *Specialist.*

Under this project investigations are made of foreign markets for American farm and nonmanufactured food products, and assistance is rendered wherever possible in developing export trade in such products. Investigations are made regarding the world's supply and demand for the principal agricultural products, and the trend of export and import trade, transoceanic and foreign transportation, methods of distribution and sale in foreign countries, trade practices and preferences, and the various competitive factors encountered abroad by American producers and shippers.

Investigations are made also of the importation of farm and nonmanufactured food products and the influence of such imports on the domestic markets.

*Scientific staff.*—Edward A. Foley, agricultural trade commissioner; Leo J. Schaben and C. L. Luedtke, assistants; Henry H. Wing, special agent; D. S. Bullock, live-stock commissioner; and Howard E. Kramer, specialist in ocean transportation.

**Cooperative Purchasing and Marketing.**F. S. RUGGLES, *Investigator in Cooperation Organization, Acting in Charge.*

Under this project studies are made of the methods of organizing and operating cooperative marketing and purchasing associations. Suggested plans of organization and by-laws for cooperative purchasing and marketing associations are prepared, and a suggested cooperative law has been worked out. Where advisable, assistance is given to groups intending to organize. Surveys to determine the extent of cooperative buying and selling in the United States, and the volume of business transacted by cooperative enterprises are made.

*Scientific staff.*—J. M. Mehl and Theo Wade, investigators in cooperative organization.

**Transportation of Farm Products.**G. C. WHITE, *Specialist in Charge of Transportation.*

Commercial problems involved in the transportation of farm products are investigated; the needs of producers and distributors are called to the attention of carriers; producers and shippers are impressed with their joint responsibility with carriers in the safe transportation of their products to market; shippers are urged to cooperate with carriers in alleviating car shortage by loading cars more heavily, by loading and unloading promptly, and by placing diversion orders at diversion points prior to the arrival of cars. Complaints and appeals for assistance with respect to transportation which reach the department are taken up with the railroads involved.

A very important phase of the work of the transportation specialists is that done in making arrangements with the railroads for the reports upon which much of the market news service work of the bureau is based.

*Scientific staff.*—Jas. G. Cross, specialist in transportation; F. M. Patton, W. H. Seidel, and J. E. Stubblefield, assistants in transportation.

**Division of Warehousing.**

**Administration of the United States Warehouse Act.** CHESTER MORRILL, *Assistant to the Chief.*

The purpose of this work is to inspect and classify warehouses applying for license under the United States warehouse act; to license warehouses that are found to be suitable for the proper storage of cotton, grains, flaxseed, wool, and tobacco; to license weighers and graders desiring to weigh and grade agricultural products stored or to be stored in warehouses licensed under this act; to license any person not a warehouseman to accept custody of cotton, grains, flaxseed, wool, and tobacco, and to store same in a warehouse owned or operated by any State; to prescribe the duties of warehouseman licensed by the Secretary of Agriculture to make rules and regulations for carrying out the provisions of the United States warehouse act, and to prescribe the conditions of the bond required of licensed warehousemen; to investigate the storage, warehousing, classifying, according to grade or otherwise, weighing and certification of cotton, grains, flaxseed, wool, and tobacco; to establish and promulgate standards for the agricultural products specified in the act, not already standardized by the bureau or not handled by the other projects, by which their quality or value may be judged or determined; and to make such other investigations as may be necessary for carrying out the provisions of the United States warehouse act.



*Scientific staff.*—R. L. Newton, C. Nagel, F. B. Wilkinson, J. P. Brown, and H. K. Holman, investigators in warehousing; J. M. Workman, specialist in warehouse construction; F. G. Crout and W. A. McKenna, assistants in warehousing investigations; Paul E. Brady, assistant in grain-dust explosion; John P. Joines, Randolph D. Cunningham, and Abraham L. Wiley, warehouse inspectors.

**Cold-Storage Investigations.** I. C. FRANKLIN, *Specialist in Storage.*

Data are secured relative to the quantity and kinds of foodstuffs held in storage and the length of time they are held. Trade practices and costs of constructing and operating storage plants are studied.

**Completion of the Work of the Domestic Wool Section of the War Industries Board.**

WELLS A. SHERMAN, *Specialist.*

By Executive order dated December 31, 1918, the work of the Wool Division of the War Industries Board was transferred to the Bureau of Markets, which since has been engaged in auditing accounts received from dealers and in collecting and distributing the excess profits made by those dealers.

Up to December 4, 1920, about 4,800 complete reports of 1918 wool transactions had been received from country dealers. In addition detailed reports were secured from 178 distributing center dealers who operated in the year 1918.

A total of \$548,309 has been collected on account of excess profits. Refunds to wool growers to October 25, 1920, have amounted to \$36,978. The balance of the money which has been collected, as well as that which remains to be collected as a result of future audits, will be held in the Treasury and at some date in the near future distributed to those growers to whom refunds are due.

*Scientific staff.*—J. William Park, assistant.

**BOARDS AND COMMITTEES.**

**Insecticide and Fungicide Board.**

The Insecticide and Fungicide Board, created December 22, 1910, assists the Secretary of Agriculture in the enforcement of the insecticide act of 1910.

*Members.*—J. K. Haywood, chairman; M. B. Waite, A. L. Quaintance, and James A. Emery; assistant to chairman, J. G. Shibley.

**Federal Horticultural Board.**

The Federal Horticultural Board, created August 21, 1912, assists the Secretary of Agriculture in the enforcement of the plant quarantine act of August 20, 1912.

*Members.*—C. L. Marlatt, chairman; W. A. Orton, vice chairman; George B. Sudworth, W. D. Hunter, and Karl F. Kellerman; R. C. Althouse, assistant to the chairman. *Entomological inspectors.*—William B. Wood, H. L. Sanford, Norman Perrine, W. S. Fisher, H. Y. Gouldman, Ralph Shemin, and L. L. Spessard.

*Pathological inspectors.*—John A. Stevenson, John T. Rogers, Henry F. Bain, and James M. R. Adams.

*Pathologist in charge foreign plant quarantines.*—R. Kent Beattie.

**PORT INSPECTION SERVICE.**

E. R. SASSCER, *Entomologist in Charge; Assistant*, O. K. COURTNEY.

This service enforces the conditions of entry with relation to cotton, nursery stock, and other plants and plant products the entry of which is regulated, and guards against the entry of prohibited plants and plant products.

*Boston office.*—R. I. Smith, quarantine inspector in charge; assistants, Willard G. Bemis and Louis M. Scott.

*New York office.*—H. B. Shaw, pathologist in charge; assistants, A. J. Bruman, Roberts G. Cogswell, Herman G. Frank, Lester C. Griffith, J. A. McCutchin, and Joseph Rubinger.

*Philadelphia office.*—Max Kisliuk, jr., plant quarantine inspector in charge.

*Norfolk Office.*—C. E. Prince, plant quarantine inspector in charge.

*Seattle office.*—A. G. Webb, plant quarantine inspector in charge.

*Portland office.*—Harry Sargent, plant quarantine inspector in charge.

*San Francisco office.*—W. S. Fields, pathological inspector in charge.

*Calcutta office.*—O. A. Pratt, plant quarantine inspector in charge.

*New Orleans office.*—Emile Kostal, plant quarantine inspector in charge; assistant, Curtis Benton.

## MEXICAN BORDER PORT INSPECTION SERVICE.

E. R. SASSCER, *Entomologist in Charge*; Assistant, O. D. DEPUTY, *Chief Inspector*.

The inspectors engaged in this service are charged with the enforcement of the rules and regulations prohibiting the movement of cotton and cotton seed from Mexico into the United States, and governing the entry into the United States of railway cars and other vehicles, freight, express, baggage, or other materials from Mexico at border points, to guard against the entry with such vehicles and materials of the pink bollworm of cotton. These inspectors are distributed as follows:

*Brownsville*.—H. G. H. Weinert, plant quarantine inspector in charge; assistant, Maceo M. Richardson.

*Del Rio*.—L. R. Dorland, plant quarantine inspector in charge; assistant, Daniel E. Gower.

*Eagle Pass*.—J. Alden Davis, plant quarantine inspector in charge; assistants, Harvey A. Horton, J. B. R. Leary, A. K. Pettit, and Clyde P. Trotter.

*El Paso*.—H. H. Willis, plant quarantine inspector in charge; assistants, Benjamin Druckerman, Samuel L. Foster, Harold W. Lamp, and Joseph M. Singleton.

*Laredo*.—Edgar S. Jewell, plant quarantine inspector in charge; assistants, Joseph E. Fouser, William H. Freeman, Earl G. Hagadorn, Clifton C. Halbedl, Donald B. Hussey, and William T. Owrey.

*Nogales*.—H. M. Cely, plant quarantine inspector in charge; assistant, F. A. Johnston.

## PINK BOLLWORM ERADICATION.

This work involves the inspection of cotton fields to determine any sporadic outbreaks of the pink bollworm; in cooperation with the State concerned the clean-up of any infested fields found; the establishment of cotton-free areas at points which may have been infested as a further means of extermination and of cotton-free zones on or near the border of any State or States adjacent to Mexico to prevent natural migration and entry of the insect; and the conduct of such other work as may be necessary to prevent the establishment or spread of the pink bollworm in the United States.

*Houston office*.—W. D. Hunter, in charge; plant quarantine inspectors, Robert L. Anderson, jr., Thomas A. Arnold, Garapet M. Avakian, Walter E. Ayers, Charles E. Bellis, G. Claude Bond, James S. Brock, H. M. Brundrett, Marshall E. Cole, Leo F. Curl, William W. Decell, Wimberley T. Dillard, R. L. Eberhard, Roy A. Epperson, Marvin H. Ford, Albert H. Greer, G. G. Harris, Paul A. Hoidale, Chester F. Jenkins, Alpha C. Johnson, Miller J. Kerr, Walter T. Kelley, Wesley L. Miles, Malcolm I. Miller, H. C. Millender, Jules B. Moore, James H. Moreland, Douglas M. McEachern, Peter L. Netterville, Walter Ohlendorf, Joe W. Patterson, Enoch F. Pepper, Herbert B. Prickett, Felix S. Puckett, Wayne F. Rice, Conrad R. Roitsch, Ralph R. Rosa, Clarence V. Scott, Sidney D. Smith, Warren R. Sudduth, Karl H. Townsend, William E. Von Rosenberg, Edward L. Wilde, and J. Carter Woodward.

## PINK BOLLWORM WORK IN MEXICO.

This work consists of surveys to determine the distribution of the pink bollworm in Mexico near the border of the United States, and, in cooperation with the Mexican Government or local Mexican authorities, of conducting clean-up operations in an effort to exterminate local outbreaks of this insect.

## COLLABORATORS OF THE BOARD.

Some 70 State officials connected with plant quarantine and control work have been appointed collaborators of the Federal Horticultural Board to assist in the enforcement of the various quarantine and regulatory orders issued under the plant quarantine act.

**Editorial Committee of the Journal of Agricultural Research.**

The Journal of Agricultural Research publishes technical papers giving the results of the various lines of research carried on by the department and by the State agricultural experiment stations. The selection of the papers and the conduct of the Journal are intrusted to the editorial committee.

*Members*.—K. F. Kellerman (chairman), E. W. Allen, and C. L. Marlatt for the Department of Agriculture; J. G. Lipman (New Jersey), W. A. Riley (Minnesota), and R. L. Watts (Pennsylvania) for the Association of Land-Grant Colleges; Margaret J. E. Brown, editorial clerk.

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PART 2.

STATE AGRICULTURAL COLLEGES AND  
EXPERIMENT STATIONS.

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Prepared in the States Relations Service,  
A. C. TRUE, *Director*.

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<sup>1</sup> Since Dec. 1, 1920, at East Lansing, Mich.

## KEY TO ABBREVIATIONS.

<i>Acct.</i> , Accountant, Accounts.	<i>Indus.</i> , Industry, Industrial, Industries.
<i>Actg.</i> , Acting.	<i>Inorg.</i> , Inorganic.
<i>Admin.</i> , Administration, Administrative.	<i>Insp.</i> , Inspection, Inspector.
<i>Agr.</i> , Agriculture, Agriculturist, Agricultural.	<i>Instr.</i> , Instruction, Instructor.
<i>Agron.</i> , Agronomy, Agronomist.	<i>Insts.</i> , Institutes.
<i>Agt.</i> , Agent.	<i>Invest.</i> , Investigations, Investigational.
<i>An.</i> , Animal.	<i>Irrig.</i> , Irrigation, Irrigationist.
<i>Anal.</i> , Analytical, Analysis.	<i>Lab.</i> , Laboratory.
<i>Anat.</i> , Anatomy.	<i>Landsc.</i> , Landscape.
<i>Arch.</i> , Architecture.	<i>Lect.</i> , Lecturer.
<i>Assoc.</i> , Associate.	<i>Libr.</i> , Library, Librarian.
<i>Asst.</i> , Assistant.	<i>Mach.</i> , Machine, Machinery.
<i>Bact.</i> , Bacteriology, Bacteriologist.	<i>Mech.</i> , Mechanics, Mechanical.
<i>Biochem.</i> , Biochemist, Biochemistry.	<i>Met.</i> , Meteorology, Meteorologist.
<i>Biol.</i> , Biology, Biologist, Biological.	<i>Mfrs.</i> , Manufactures.
<i>Bot.</i> , Botany, Botanist, Botanical.	<i>Mgr.</i> , Manager.
<i>Brdg.</i> , Breeding.	<i>Mgt.</i> , Management.
<i>Chair.</i> , Chairman.	<i>Microbiol.</i> , Microbiology, Microbiologist.
<i>Chem.</i> , Chemistry, Chemist, Chemical.	<i>Mycol.</i> , Mycology, Mycologist.
<i>Climat.</i> , Climatology, Climatologist.	<i>Nutr.</i> , Nutrition.
<i>Coll.</i> , College.	<i>Oler.</i> , Olericulture, Olericulturist.
<i>Comp.</i> , Comparative.	<i>Org.</i> , Organic.
<i>Comr.</i> , Commissioner.	<i>Ornith.</i> , Ornithology, Ornithologist.
<i>Consult.</i> , Consulting.	<i>Parasitol.</i> , Parasitology, Parasitologist.
<i>Coop.</i> , Cooperation, Cooperative, Cooperator.	<i>Path.</i> , Pathology, Pathologist.
<i>Corresp.</i> , Correspondence, Correspondent.	<i>Pedag.</i> , Pedagogy, Pedagogics.
<i>Dem.</i> , Demonstration, Demonstrator.	<i>Pharm.</i> , Pharmacy, Pharmacist, Pharmaceutical.
<i>Dept.</i> , Department.	<i>Photog.</i> , Photography, Photographer.
<i>Dir.</i> , Director.	<i>Phys.</i> , Physics, Physicist, Physical.
<i>Dist.</i> , District.	<i>Physiol.</i> , Physiology, Physiologist, Physiological.
<i>Distrib.</i> , Distribution.	<i>Pomol.</i> , Pomology, Pomologist, Pomological.
<i>Div.</i> , Division.	<i>Pract.</i> , Practice, Practical.
<i>Dom.</i> , Domestic.	<i>Prep.</i> , Preparatory.
<i>Econ.</i> , Economy, Economic, Economics.	<i>Pres.</i> , President.
<i>Ed.</i> , Education.	<i>Prin.</i> , Principal.
<i>Ele.</i> , Elementary.	<i>Prod.</i> , Production, Products.
<i>Engin.</i> , Engineer, Engineering.	<i>Prof.</i> , Professor.
<i>Ent.</i> , Entomology, Entomologist, Entomological.	<i>Pubs.</i> , Publications.
<i>Erad.</i> , Eradication.	<i>Sci.</i> , Science, Scientific.
<i>Expt.</i> , Experiment, Experimentalist, Experimental.	<i>Secy.</i> , Secretary.
<i>Ext.</i> , Extension.	<i>Secon.</i> , Secondary.
<i>Feed.</i> , Feeding.	<i>Sociol.</i> , Sociology.
<i>Fert.</i> , Fertility, Fertilizer.	<i>Sta.</i> , Station.
<i>Flor.</i> , Floriculture, Floriculturist, Floricultural.	<i>Substa.</i> , Substation.
<i>For.</i> , Forestry.	<i>Supt.</i> , Superintendent.
<i>Gard.</i> , Gardening.	<i>Supr.</i> , Supervisor.
<i>Gen.</i> , General.	<i>Surg.</i> , Surgery.
<i>Geol.</i> , Geology, Geologist, Geological.	<i>Tech.</i> , Technology, Technologist, Technical.
<i>Grad.</i> , Graduate.	<i>Treas.</i> , Treasurer.
<i>Histol.</i> , Histology.	<i>Trop.</i> , Tropical.
<i>Hon.</i> , Honorary.	<i>Univ.</i> , University.
<i>Hort.</i> , Horticulture, Horticulturist, Horticultural.	<i>Veg.</i> , Vegetable, Vegetation.
<i>Husb.</i> , Husbandry, Husbandman.	<i>Vet.</i> , Veterinary, Veterinarian.
<i>Hyg.</i> , Hygiene.	<i>Vit.</i> , Viticulture, Viticulturist, Viticultural.
	<i>Voc.</i> , Vocational.
	<i>Zool.</i> , Zoology, Zoologist.

# STATE AGRICULTURAL COLLEGES AND EXPERIMENT STATIONS.

## ALABAMA.

Alabama Polytechnic Institute and the Agricultural Experiment Station,  
Auburn.

\*College faculty. †Station staff. ‡Extension staff.

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\*†J. F. Duggar, M. S., *Dir. of Sta. Agr. (\*†)*

‡L. N. Duncan, M. S., *Dir. of Ext. Service.*

\*P. F. Bahnsen, V. S., *Lect. on Phys. Diagnosis.*

†K. G. Baker, B. S., *Beef Cattle Specialist.*

†F. E. Boyd, M. S., *Ext. Agron.*

†R. G. Briggs, A. M., *Asst. Ext. Hort.*

‡Lyle Brown, B. S., *Ext. Hort.*

\*Otto Brown, M. S., *Asst. Prof. Hort.*

†G. L. Burleson, B. S., *Asst. An. Husb.*

\*F. W. Burns, B. S., *Asst. Prof. An. Husb.*

\*†C. A. Cary, B. S., D. V. M., *Dean of Vet. Med. and Surg.; Vet. (State Vet.) Dir. Farmers' Insts.*

†E. F. Cauthen, B. S., *Agr.*

\*††P. O. Davis, B. S., *Editor.*

\*††W. H. Eaton, B. S., *Assoc. Prof. Dairying; Assoc. Dairyman.*

‡Mary Faminear, B. S., *State Home Dem. Agt.*

\*†M. J. Funchess, M. S., *Prof. Agron.; Soils. Asst. Dean.*

\*†W. A. Gardner, Ph. D., *Prof. Bot., Plant Physiol.; Bot.*

†Ernest Gibbens, B. S., *Asst. in Beef Husb. (P. O., Allenville).*

\*††M. A. Glenn, *Treas.*

\*††J. C. Grimes, M. S., *Prof. An. Husb.; An. Husb.*

\*C. L. Hare, M. S., *Prof. Phys. and Physiol. Chem.*

†J. L. Herron, B. S., *State Boys' Club Agt.*

\*††W. E. Hinds, Ph. D., *Prof. Ent.; Ent.*

\*†C. L. Isbell, B. S., *Asst. Prof. Hort.; Assoc. Hort.*

‡Helen Johnson, A. M., *Asst. State Agt., Girls' Club Work.*

\*†G. R. Johnstone, M. S., *Asst. Prof. Bot.; Asst. Bot.*

‡Lida Jones, *Asst. State Home Dem. Agt.*

\*L. C. LeBron, B. S., *Asst. in Agr. Engin.*

\*I. S. McAdory, B. S., D. V. M., *Prof. Vet. Sci.*

\*G. H. Marsh, M. S., *Asst. Prof. Chem.*

\*H. M. Martin, M. S., *Instr. Chem.*

\*†Mary E. Martin, *Libr.*

†O. N. Massengale, B. S., *Asst. Chem.*

\*D. J. Meador, B. S., D. V. M., *Lect. on Hyg. and Sanitation.*

\*†E. R. Miller, Ph. D., *Prof. Org. Chem.; Research Chem.*

\*††M. L. Nichols, M. S., *Prof. Agr. Engin.; Agr. Engin.*

†M. H. Pearson, B. S., *Marketing Specialist.*

\*P. P. Powell, M. S., *Asst. Prof. Chem.*

\*†J. M. Robinson, M. A., *Assoc. Prof. Zool., Ent.; Asst. Ent.*

\*B. B. Ross, M. S., LL. D., *Prof. Chem., Dean of Agr. Sci. (State Chem.)*

\*††G. C. Starcher, B. Agr., *Prof. Hort.; Hort. (State Hort.)*

†F. D. Stevens, B. S., *Farm Mgt. Specialist (Coop. U. S. D. A.: P. O. Birmingham).*

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\*J. W. Tidmore, B. S., *Instr. Agron.*

†H. B. Tisdale, M. S., *Assoc. in Plant Brdg.*

\*W. W. Webb, D. V. M., M. S., *Instr. Physiol. and Therapeutics.*

\*G. R. White, M. D., D. V. S., *Lect. on An. Restraint and Surg.*

†J. T. Williamson, B. S., *Field Agt. in Agron.*

†Mina A. Willis, M. S., *Asst. State Home Dem. Agt.*

†H. C. Wilson, D. V. M., *Hog Cholera Expert (Coop. U. S. D. A.).*

\*E. S. Winters, B. S., D. V. M., *Lect. on Anti-Hog Cholera Serum.*

NOTE.—These lists were compiled by Mary A. Agnew and Althea E. Thacker, of the States Relations Service. They include only names of persons directly engaged in teaching, investigation, or demonstration in agriculture and home economics.

An asterisk (\*) indicates a college officer, a dagger (†) a station officer, and a double dagger (‡) an extension worker. When the title of the position in the station differs from that in the college the latter is given first, except in the case of the director of the station. A key to the abbreviations used is given on page 4.



**Canebrake Agricultural Experiment Station, Uniontown.**†J. M. Burgess, B. S., *Director.***Agricultural and Mechanical College for Negroes, Normal.**

\*College faculty. ‡Extension staff.

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\*College faculty. †Station staff. ‡Extension staff.

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United States Department of Agriculture.

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\*College faculty. †Station staff. ‡Extension staff.

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 ††R. N. Davis, B. S., *Asst. Dairy Husb.*  
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 \*†R. S. Hawkins, B. S., *Asst. Prof. Agron.; Asst. Agron.*  
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 †Alice V. Joyce, *State Home Dem. Leader.*  
 \*††A. F. Kinnison, B. S., *Asst. Prof. Hort.; Asst. Hort.*  
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 \*Lulu Lancaster, *Instr. Home Econ.*  
 \*Estelle Luttrell, A. B., *Libr.*

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 ††H. C. Schwalen, B. S., *Asst. Irrig. Engin.*  
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 \*†G. E. Thompson, B. S., *Prof. Agron.; Agron.*  
 \*†R. B. Thompson, B. S., *Assoc. Prof. Poultry Husb.; Poultry Husb.*  
 \*†J. J. Thornber, A. M., *Prof. Bot.; Bot.*  
 \*†A. E. Vinson, Ph. D., *Prof. Agr. Chem.; Chem.*  
 \*†C. T. Vorhies, Ph. D., *Prof. Ent.; Ent.*  
 \*Jessamine C. Williams,<sup>1</sup> B. S., *Prof. Home Econ.*  
 \*†R. H. Williams,<sup>1</sup> Ph. D., *Prof. An. Husb.; An. Husb.*

## ARKANSAS.

## College of Agriculture and the Agricultural Experiment Station of the University of Arkansas, Fayetteville.

\*College faculty. †Station staff. ‡Extension staff.

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 \*†W. J. Baerg, A. B., *Head Dept. of Ent.*  
 \*Oswald Blackwood, B. A., *Asst. Prof. Phys.*  
 \*†W. L. Bleecker, D. V. M., *Head Dept. of Bact. and Path.*  
 †Connie J. Bonslagel, A. B., *Home Dem. Agt. Leader (P. O., Little Rock).*  
 \*J. T. Buckholz, Ph. D., *Head Dept. of Bot.*  
 †J. H. Bux, D. V. M., *Actg. Head Dept. of Vet. Sci. (Actg. State Vet., P. O., Little Rock).*  
 †Gertrude E. Conant, B. A., *Specialist in Nutr. (P. O. Little Rock).*  
 \*†J. R. Cooper, A. M., *Head Dept. of Hort.*  
 \*Ruth M. Cowan, B. S., *Asst. Prof. Home Econ.*  
 \*†H. E. Dvorachek, B. S., *Head Dept. of An. Husb.*  
 \*†J. A. Elliott, Ph. D., *Head Dept. of Plant Path.*  
 †R. L. Foster, *Ext. Editor (P. O., Little Rock).*  
 \*Margaret Gallaway, *in charge Agr. Libr.*  
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 \*Harrison Hale, Ph. D., *Head Dept. of Chem.*  
 \*Jean Hill, B. A., *Instr. Home Econ.*  
 †E. A. Hodson, M. S., *Agt. in Cotton Marketing Dem. (P. O., Little Rock).*  
 \*†R. A. Hunt, B. S., *Instr. An. Husb.; Asst. An. Husb.*  
 †W. J. Jernigan, B. A., *State Club Agt. (P. O., Little Rock).*  
 †H. B. Lansden, *Specialist in Poultry Husb. (P. O., Little Rock).*  
 \*†A. D. McNair, *Prof. Farm Mgt. and Specialist in Farm Mgt.*  
 \*†R. H. Mason, B. S., *Asst. Prof. An. Husb.; Asst. An. Husb. (Dairying).*  
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 \*H. E. Morrow, B. S., *Assoc. Prof. Chem.*  
 \*†Martin Nelson, M. S., *Head Dept. of Agron. Vice Dean of Coll. and Vice Dir. of Sta.*  
 \*†L. W. Osborn, B. S., *Asst. Prof. Agron.; Asst. Agron.*  
 \*Stella Palmer, B. S., *Head Dept. of Home Econ.*  
 \*F. W. Pickel, M. S., *Head Dept. of Biol.*  
 \*†C. W. Rapp, M. S., *Asst. Prof. Hort.; Asst. Hort.*  
 \*†J. W. Read, M. S., *Head Dept. of Agr. Chem.*

<sup>1</sup> On leave.

- \*G. E. Ripley, M. S., *Prof. Phys.*  
 \*†H. R. Rosen, M. S., *Asst. Prof. Plant Path.; Asst. Plant Path.*  
 \*†W. H. Sachs, M. A., *Assoc. Prof. Agron.; Asst. Agron. (Soils).*  
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 \*C. L. Stewart, Ph. D., *Prof. Econ. and Sociol.*  
 \*†S. R. Stout, B. S., *Asst. Prof. An. Husb.; Asst. An. Husb. (Poultry).*  
 \*†Barnett Sure, Ph. D., *Asst. Prof. Agr. Chem.; Asst. Agr. Chem.*

- \*†J. E. Syferd, D. V. M., *Asst. Prof. Vet. Sci.; Asst. Vet.*  
 \*Anna B. Thompson, B. S., *Instr. Home Econ.*  
 \*H. M. Trimble, B. S., *Instr. Chem.*  
 \*†J. O. Ware, M. S., *Asst. Prof. Agron.; Asst. Agron.*  
 ‡W. H. Woodley, B. A., *Specialist in Dairying.*  
 ‡Claude Woolsey, M. S., *Specialist in Hort.*  
 ‡T. R. H. Wright, B. S., *Specialist in Marketing (Coop. U. S. D. A.).*

### Branch Normal College, Pine Bluff.

\*College faculty.

- \*J. G. Ish, jr., A. B., *Superintendent. Chem.*  
 \*Alonzo Leonard, *Dir. Agr. Dept.*

- \*Ludie Anderson, *Instr. Cooking, Sewing.*  
 \*Henry Harris, *Instr. Agr.*  
 \*Exie Kelley, *Teacher Training in Home Econ.*

- \*Leroy Moore, *Prof. Chem., Phys., Biol.*  
 \*Clara Stevens, *Instr. Home Econ.*  
 \*C. S. Woodard, *Teacher Training in Agr.*

### CALIFORNIA.

#### College of Agriculture and the Agricultural Experiment Station of the University of California, Berkeley.

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- \*†J. R. Haswell, C. E., *Asst. Prof. Farm Mech. Ext.*
- \*†H. H. Havner, M. S., D. V. M., *Prof. An. Husb. Ext.*
- \*†J. B. Hill, Ph. D., *Prof. Bot.*
- \*†H. E. Hodgkiss, B. S., *Prof. Ent. Ext.*
- \*†F. J. Holben, B. S., *Instr. Soil Tech.*
- \*†J. L. Horsfall, M. S., *Instr. Econ. Ent. (P. O., Bustleton).*
- \*†F. S. Hultz, M. S., *Asst. Prof. An. Husb.*
- \*†C. A. Hunter, M. S., *Assoc. Prof. Bact.*
- \*†A. T. Kearney,<sup>1</sup> B. S., *Asst. Prof. Rural Organization Ext.*
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- \*†R. C. Walton, B. S., *Asst. Prof. Plant Path. (P. O., Arendtsville).*

<sup>1</sup> On leave.



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| *†J. H. Waring, B. S., <i>Asst. in Expt. Pomol.</i>                  | *†E. I. Wilde, M. S., <i>Assoc. Prof. Flor.</i>  |
| *†F. P. Weaver, B. S., <i>Prof. Agr. Ext.</i>                        | *†P. S. Williams, B. S., <i>Asst. in Dairy Husb. Ext.</i>                                    |
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| *†R. R. Welch, M. S., <i>Assoc. Prof. Dairy Husb. Ext.</i>           | *Sara M. Wilson, M. A., <i>Asst. Prof. Dom. Sci. and Teacher Training in Voc. Home Econ.</i> |
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**PORTO RICO.**

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 \*C. E. Horne, Ph. D., *Dean of College (P. O., Mayaguez).*

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| *Joseph Axtmayer, <i>Prof. Phys. and Org. Chem.</i> | *A. J. Fredholm, Sc. D., D. Agr., <i>Prof. Veg. Path. and Lect. on Special Crops.</i> |
| *Samuel Basherow, B. S., <i>Prof. An. Husb.</i>     | *R. I. Garton, M. S., <i>Prof. Biol.</i>  |
| *Annette J. Carpenter, B. S., <i>Instr. Chem.</i>   | *Fernando Margarida, B. S., <i>Prof. Chem.</i>  |
| *H. T. Cowles, B. S., <i>Prof. Hort.</i>            | *P. H. Struthers, Ph. B., <i>Prof. Bot.</i>   |

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†Station staff.

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| †J. O. Carrero, B. S., Ch. E., <i>Asst. Chem.</i>                            | †W. P. Snyder, M. S., <i>Asst. in Plant Brdg.</i> |
| †H. C. Henriksen, B. Agr., <i>Specialist in Farm Mgt. (P. O., San Juan).</i> | †W. V. Tower, B. S., <i>Ent.</i>                  |
| †T. B. McClelland, A. B., <i>Hort.</i>                                       | †L. G. Willis, B. S., <i>Chem.</i>                |

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†E. D. Colón, M. S., *Director.*

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<sup>1</sup> On leave.

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 †R. E. Johnston, B. S., *Ext. Agron.*  
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 †May Kiethline, *Asst. State Club Leader*.  
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 \*R. A. Larson, *Secy.*  
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 \*H. B. Mathews, M. S., *Prof. Phys., Vice Dean, Dir. of Summer School*.  
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 \*J. B. Taylor, D. V. M., *Instr. Vet. Sci. and Bact.*  
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 \*Grace E. Wasson, B. A., *Instr. Home Econ.*  
 †G. S. Weaver, V. S., *Specialist in An. Diseases*.  
 \*†C. F. Wells, M. S., *Instr. Chem.; Asst. Chem.*  
 \*Hazel M. Willis, B. S., *Assoc. Prof. Indus. Art.*  
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 \*†T. H. Wright, jr., B. S., *Asst. Prof. Dairy Husb.; Asst. Dairy Husb., Dairy Bact.*

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 †C. E. Brehm, B. S., *Asst. Dir. Div. of Agr. Ext.*  
 †F. H. Broome, *Secy., Libr.*  
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 \*W. A. Campbell, *Farm Foreman*.  
 †W. L. Clevenger, B. S., *Asst. Dairy Specialist*.  
 †J. E. Converse, *Asst. in Coop. Expts. (P. O., Crossville)*.  
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 †T. F. Dixon, D. D., *Specialist in Rural Sociol.*  
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